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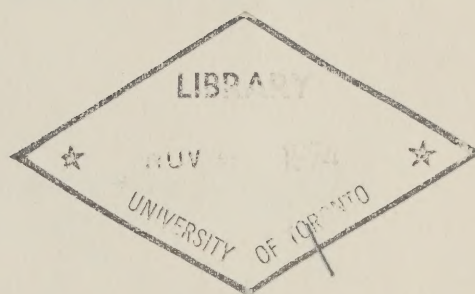
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MINISTRY OF ENERGY



ANNUAL REPORT

Year ending March 31, 1974



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Ministry of
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416/965-4286

Queen's Park
Toronto Ontario

June 11, 1974

TO THE HONOURABLE PAULINE M. MCGIBBON
O.C., B.A., LL.D., D.U. (OTT.)

Lieutenant-Governor of the Province of Ontario

MAY IT PLEASE YOUR HONOUR:

I take pleasure in submitting the First Annual
Report for the Ministry of Energy for the fiscal
year ending March 31, 1974.

Respectfully submitted

W. Darcy McKeough
Minister



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Ministry of
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Queen's Park
Toronto Ontario

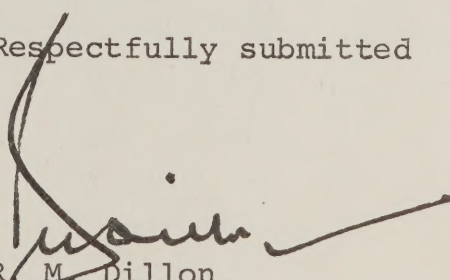
June 11, 1974


TO THE HONOURABLE W. DARCY MCKEOUGH
Minister of Energy, Ontario

Sir:

I have the honour to present the First Annual
Report of the Ministry of Energy for the fiscal
year ending March 31, 1974.

Respectfully submitted


R. M. Dillon
Deputy Minister



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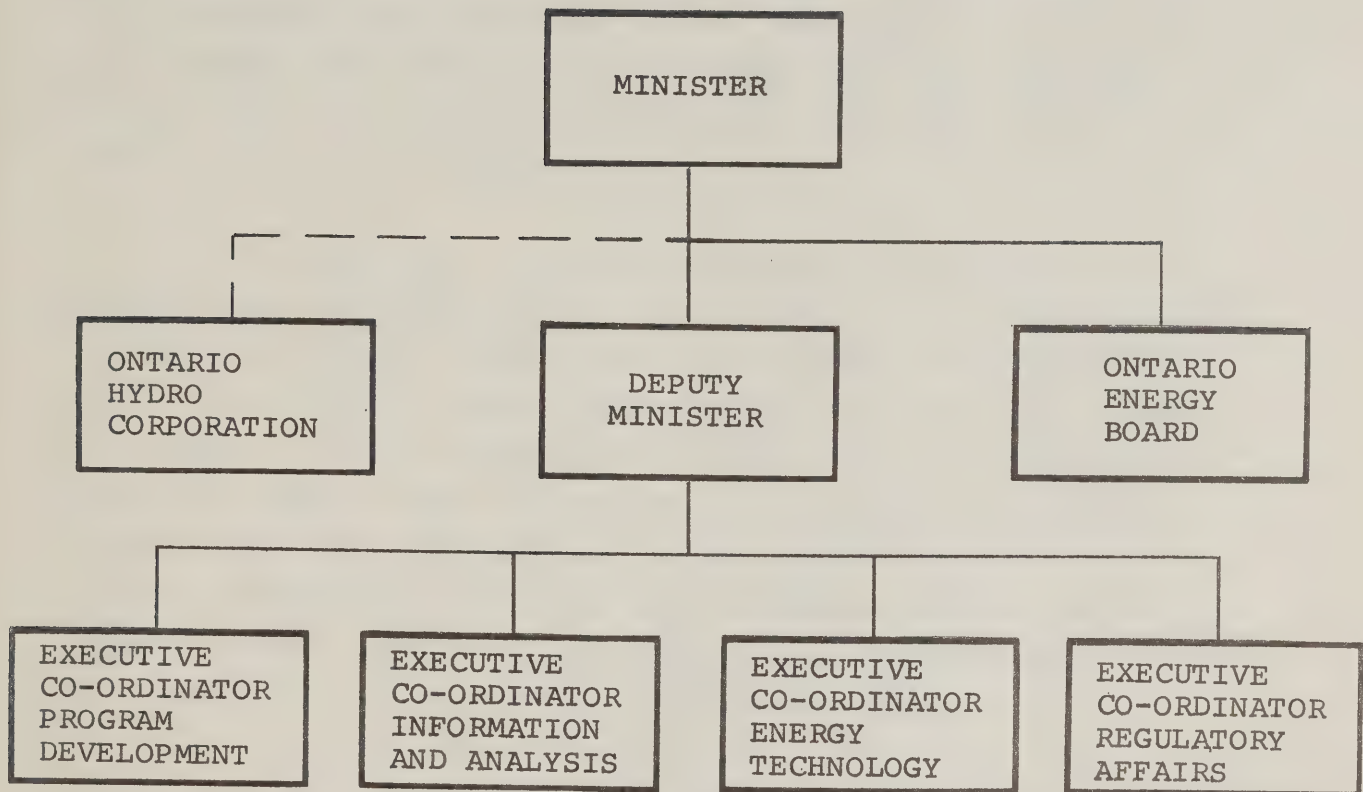
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ORGANIZATION



DEPUTY MINISTER'S SUMMARY

The major responsibility of the Ministry of Energy is to effect Provincial energy policy to ensure an adequate and secure supply of energy at reasonable prices with acceptable environmental impact. This responsibility, under normal circumstances, would pose a major challenge for any new organization. In this case, the situation has been exacerbated by rapidly unfolding changes on the energy scene. The threatened fuel shortage in the late fall of 1973, and the January First Ministers' Conference in 1974 were major issues which had to be contended with during the critical first months of the Ministry's existence.

The Ministry is being organized to function as a catalyst and co-ordinator for energy policy. It must provide the information and advice upon which detailed energy policy may be formulated. In the administration of policy it will be engaged in co-ordinating the energy-related activities of government ministries and agencies associated with energy. The Ministry will concentrate on policy matters, but it will also be responsible for providing technical support to the Ontario Energy Board and for maintaining proper liaison between the Government and the Ontario Hydro Corporation.

A most urgent need in developing Ministerial competence is in the field of information, where initial emphasis is being placed on the development of a technical library and an energy data base. Ultimately a provincial energy model will be developed with proper input from the national and international scene.

The Ministry is being organized as a compact team of specialists whose expertise will complement, rather than duplicate, that found in other government agencies and in industry.

There is to be strong reliance on seconded personnel, consultants and advisory committees. Current plans call for a total staff of just under sixty. A series of advisory committees totalling approximately the same number is being considered. At the end of the fiscal year 1973-74, nine professionals and virtually all supporting staff have been recruited.

PROGRAM DEVELOPMENT GROUP

The role of the Program Development Group is the identification and continuing evaluation of issues requiring policy analysis, policy formulation and/or policy implementation. The Group also has special responsibility for the formal aspects of long-range planning, including the surveillance of new and emerging energy sources. It also exercises a general responsibility for the administration of work programs throughout the Ministry.

Since its establishment in the fall of 1973, the group has played a key role in the development of policy positions on a number of critical issues. To a large extent, the program of work was pre-empted by the need to establish an Ontario Government approach to the urgent petroleum supply and pricing situation which faced us over the winter.

The Group produced a series of background papers for the First Ministers' Conference on Energy held on January 22-23 of this year in Ottawa. Since then, a series of Policy Group meetings have been held by the Federal Government, to keep the Minister informed on developments in other provinces.

While the First Ministers' Conference dealt primarily with the petroleum situation, the Group also prepared papers on other energy forms including natural gas, coal, nuclear power, hydro-electricity and future energy forms. Economic and fiscal impacts were also covered in the Background Papers, and the complete series was released publicly at the First Ministers' Conference.

Following the agreement in February, on a national price for crude oil, attention was directed toward the problems of future supplies and pricing of natural gas.

The Ministry's concern for the uranium industry was reflected in a policy paper prepared in close co-operation with the Ministry of Natural Resources. This paper was released in late March.

In connection with electricity developments generally, a program of electrification of the North has been developed by the Program Development Group and Ontario Hydro. The program is designed to provide needed services to remote Northern Ontario communities and is part of a general development scheme for the North.

Another northern project for which the Group is responsible is the Onakawana lignite mine which has been the subject of many studies. Presently, the chances of proceeding with development of the mine appears favourable and the Group will continue to monitor its progress through to implementation.

A number of other projects were undertaken during the year including the international promotion of CANDU, an analysis of the Federal Energy Policy paper and relationships with Ontario Hydro and other agencies. As well, the Group assisted in the preparation of statements and speeches for the Minister and Deputy Minister and participated or attended at a number of conferences on energy matters.

INFORMATION AND ANALYSIS GROUP

The Information and Analysis Group is responsible for providing energy information and data, either directly from in-house sources or through access to federal, provincial, commercial or university information sources. The Group is also responsible for developing an overall analytic capability using economic, operations research, and systems analysis approaches.

This will permit the cost and benefit analyses of policy alternatives, the development and evaluation of alternative future energy scenarios (using the data bases established for the Ministry and the Ontario Energy Board), and advising the balance of the Ministry on economic aspects of all energy problems.

The Group will either develop or adapt energy models for Ontario's use. It is planned that energy balance models will be developed which will depict flows and uses by energy type, transmission and conversion efficiencies, and substitution processes.

A small senior staff will cover the following disciplines: economics, econometrics, statistics, operations research, financial analysis, and systems.

The Executive Co-ordinator, Information and Analysis Group, joined the Ministry in February 1974. In April, three of the key professionals had been recruited. The Group will be operational early in the 1974/75 fiscal year.

ENERGY TECHNOLOGY GROUP

The primary responsibility of the Energy Technology Group is the development of technical knowledge and the provision of technical advice to the other units in the Ministry. The Group is also responsible for conducting continuing studies of each major field of energy through liaison with advisory groups, other ministries, industry, universities and research agencies involved in each of the energy fields. The Energy Technology Group is also responsible for environmental matters as well as the Ministry conservation program.

The group will be staffed with experts from each of the following energy fields, hydro carbons which consist of crude oil, natural gas, petroleum products and petrochemicals; electricity, which consists of hydro, fossil fuels and nuclear, as well as other fuels such as coal. A considerable amount of the current workload originates as suggestions from external agencies and citizens, interested in assisting with the resolution of energy problems.

Major in-house activities have centred on the Ontario Hydro transmission and generating station siting procedures, Moosonee electrification, and the siting controversy of Ontario Hydro's 500 KV transmission lines.

A major project undertaken by the Energy Technology Group was the Ontario Conservation Program. The Ministry's role is principally that of co-ordinator and catalyst, with conservation programmes centred in operational ministries.

Conservation Program

The June 1, 1973, report to the Premier by the Honourable W. Darcy McKeough, recognized the need to moderate energy demands through efficiency and conservation as well as to assure adequate supplies. The Ministry of Energy and the Government of Ontario have accordingly devoted considerable time and effort to conservation during 1973-1974 fiscal year.

The threat of shortages of fuel oil and gasoline, brought on by political events in the Middle East, led to an extensive voluntary conservation advertising campaign in late November and early December, 1973. The objectives of the campaign were to reduce personal energy consumption and to inform the public of measures that could be taken to stretch available energy supplies if allocation or rationing became

necessary. Although the savings have not yet been quantified, there are indications of a positive response including increased sales of insulation, a two-thirds reduction in the normal Christmas lighting load, and a decrease in heating oil deliveries.

Fortunately, no shortages developed. The reasons for this were, not-too-severe winter weather, a smaller-than-expected reduction in imports, selectively reduced exports, distribution of Western crude through the Seaway and the Panama Canal, refinery operation above design capacity, transportation of Western Canadian refined products to Ontario by rail and conservation efforts by the public and industry.

At the suggestion of the Premier, a steering committee on voluntary conservation was formed in November 1973, consisting of a number of ministries with direct interest in the voluntary conservation advertising program. It was realized, however, that longer term measures and a broader approach to the idea of conservation generally is necessary. To meet these goals, the ministry retained the Ontario Research Foundation to co-ordinate and develop a government-wide conservation program. In addition, a working group was established to carry on the work initiated by the steering committee.

The Group has provided the necessary contacts within interested Ministries for co-ordination and liaison on the development of conservation programs and consists of representatives from:

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|-------------------------------------|-------------------------------------|
| . Agriculture and Food | . Government Services |
| . Consumer and Commercial Relations | . Industry and Tourism |
| . Education | . Ontario Hydro |
| . Energy | . Transportation and Communications |
| . Environment | |

The aims of the conservation program are to:

- . alleviate supply problems
- . reduce the need for capital investment
- . reduce environmental impact
- . extend the life of non-renewable resources
- . save money for those practicing conservation
- . reduce the impacts of higher energy prices

These aims can be realized through improved management, reduced consumption and increased efficiency.

Initially, projects which show the greatest potential for recovering costs through energy savings will be developed. A start has been made on projects to reduce fuel consumption in automobiles, establish residential insulation standards and to explore the potential of minimum-energy communities.

REGULATORY AFFAIRS GROUP

The Regulatory Affairs Group provides legal advice to the Ministry and to the Ontario Energy Board in regulatory matters concerning energy and in legal matters arising out of relations for the supply and delivery of energy with the Federal Government and with other provinces, and also provides guidance in the development and formulation of legislation in the energy field.

The Regulatory Affairs Group develops the provincial position and is responsible to provide or retain Counsel to represent the Government in all legal and jurisdictional matters involving the supply and allocation of fuels within the Province, the supply of fuels from other provinces and the delivery arrangements involving the Federal Government and the inter-provincial natural gas and oil pipeline transmission companies.

The primary activities of the Regulatory Affairs Group consist of representing the Crown in court and at the Ottawa hearings of the National Energy Board and at the hearings of the Alberta Energy Resources Conservation Board.

Other responsibilities include advising the Ministry with respect to performance of its functions in relation to Ontario Hydro, such as the reviewing of Orders-in-Council proposed by Ontario Hydro, providing advisory functions and the preparation of a briefing book on all proclaimed and pending Energy Legislation from other provinces, (in concert with the Program Development Group) the development of legislation for the establishment of an Ontario Energy Corporation, providing Counsel to the Ontario Energy Board in respect of rates hearings before that Board and before the National Energy Board. The Group was also involved in other hearings before the National Energy Board; for example, the Group reviewed and supported Ontario Hydro's application to the National Energy Board for an amendment to one of Ontario Hydro's power export licences. In the past year Counsel were provided or retained to conduct four major hearings before the Ontario Energy Board, at least four hearings before the Alberta Energy Resources Conservation Board and approximately seven hearings before the National Energy Board.

The year ahead promises to be just as intensive as many important issues in both the field of constitutional law and that of energy regulation are likely to arise.

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ANNUAL REPORT
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Year ending March 31, 1975





ANNUAL REPORT

Year ending March 31, 1975



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Ministry of
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416/965-4286

Queen's Park
Toronto Ontario

September, 1975

TO THE HONOURABLE PAULINE M. MCGIBBON
O.C., B.A., LL.D., D.U.(OTT.)

Lieutenant-Governor of the Province of Ontario

MAY IT PLEASE YOUR HONOUR:

I take pleasure in submitting the Second Annual
Report for the Ministry of Energy for the fiscal
year ending March 31, 1975.

Respectfully submitted

A handwritten signature in dark ink, appearing to read "D. Timbrell", written over a horizontal line.

Dennis R. Timbrell
Minister



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y Minister

Ministry of
Energy

Queen's Park
Toronto Ontario

September, 1975

TO THE HONOURABLE DENNIS R. TIMBRELL
Minister of Energy, Ontario

Sir:

I have the honour to present the Second Annual
Report of the Ministry of Energy for the fiscal
year ending March 31, 1975.

Respectfully submitted

A handwritten signature in dark ink, appearing to read "R. M. Dillon", with a long horizontal flourish extending to the right.

R. M. Dillon
Deputy Minister

ANNUAL REPORT
OF THE
MINISTRY OF ENERGY

YEAR ENDING MARCH 31, 1975

MINISTRY OF ENERGY

ANNUAL REPORT

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DEPUTY MINISTER'S SUMMARY

Fiscal year 1974 was the first full year of operation for the Ministry. During this period the staff was built up to its full complement of 39 professional and supporting personnel not including the staff of the Ontario Energy Board. The team concept, upon which the organization of the Ministry is based, appeared to be working well.

The success of this policy Ministry is dependent on the development of close working relationships, involving a high level of confidence and mutual trust with both the public and private sectors. This requirement results directly from the fact that operationally the responsibility for the effective management of energy resources rests with Government as a whole, with the energy industry and with the general public. During the past year, the Ministry's relations with other ministries, especially Transportation and Communications, Industry and Tourism, Environment, and Treasury, Economics and Intergovernmental Affairs, with Ontario Hydro and with the energy industry in general, have continued to develop in a gratifying manner. We greatly appreciate the co-operation we are receiving.

As Ontario is dependent on resources outside its borders for approximately 80% of its energy, it follows that energy pricing is of vital concern. With the setting of prices resting largely with the producing provinces and the Federal Government, the responsibility of the Ministry for negotiations with other governments and interventions before regulatory boards takes on great importance.

In response to the present dependence of Ontario on imported energy resources, the Ministry is determined to take initiatives designed to enhance supply. In this regard, the establishment of the Ontario Energy Corporation is most significant. As a first step the Energy Corporation took up a 5 percent \$100 million interest in the Syncrude Project. This project, of national as well as provincial interest, plans to produce 150,000 barrels per day of synthetic crude oil from the Alberta Oil Sands.

The Ministry will be pursuing other initiatives designed to secure supplies of natural gas and uranium for Ontario. Also, efforts will be made to stimulate the future development of new energy forms such as solar, wind or fusion power to replace the dwindling supplies of non-renewable resources.

To complement the effort to enhance supply, the Ministry, with the co-operation with some 10 other ministries, has implemented a comprehensive Energy Management Program. This program is designed to reduce the demand for energy resources by improving the efficiency of energy use, by better managing energy distribution and consumption, by encouraging voluntary action to conserve energy and by putting into practice an energy conservation ethic across Ontario.

ANNUAL REPORT

ROLE AND ORGANIZATION

The major role of the Ministry is the effective implementation of Provincial energy policy which is designed to ensure an adequate and secure supply of energy at reasonable prices with acceptable environmental impact. To fulfill this responsibility the Ministry works with other Ministries and Agencies of Government and with the energy sector, functioning more as a catalyst and co-ordinator of energy policy rather than as an operating agency.

The role of the Ministry encompasses the following functions or missions:

- reviewing and advising on energy matters
- advising on energy policy
- providing technical support to the Ontario Energy Board
- maintaining liaison between the Government and the Ontario Hydro Corporation
- applying energy policy by co-ordinating the Government's energy-related activities and through interventions before provincial and federal tribunals.

While the Minister of Energy answers to the Legislature for the policies of the Ontario Energy Board and the Ontario Hydro Corporation, both organizations function independently from the Ministry of Energy.

The internal operations of the Ministry are based on peer-group relations rather than on hierarchical structure. However, since a completely unstructured organization would not be practical, the Ministry is composed of six interdependent groups. Each group possesses a range of capabilities which, taken together, enables the Ministry to perform its role. The six groups are:

- Office of the Minister
- Office of the Deputy Minister
- Information and Analysis
- Program Development
- Energy Technology
- Regulatory Affairs

Currently the Ministry is operating with a total staff of thirty-nine, not including personnel of the Ontario Energy Board.

ACHIEVEMENTS DURING 1974

FEDERAL AND PROVINCIAL ENERGY HEARINGS

A primary responsibility of the Ministry is to represent Ontario at hearings before federal and provincial regulatory agencies. Interventions are made to protect the interests of the Ontario energy consumer by promoting the lowest possible prices consistent with security of supply. While the ultimate decisions rest with the regulatory agencies, our interventions serve to place the Ontario viewpoint before the regulatory body.

While it is usually not possible to determine in absolute terms the success of these efforts on behalf of Ontario energy consumers, price increases at issue have amounted to several hundred millions of dollars.

During the fiscal year the Ministry intervened in 13 hearings, supported by the services of consultants, extending in all to 254 days of proceedings.

A summary of interventions includes:

Before the National Energy Board

- Gas Export Pricing
- Gas Supply and Deliverability
- TransCanada PipeLines Rates Application
Phases I and II
- TransCanada PipeLines Facilities Application
- TransCanada PipeLines Coal Gasification
Application
- Lowell Gas Application
- IPL Sarnia-Montreal Pipeline Extension
- Dome Petroleum Gas Application
- 1974 Oil Export Hearings

Before the Ontario Energy Board

- Union Gas Rates
- Consumers' Gas Rates
- Northern and Central Gas Rates

Before the Alberta Energy Resources
Conservation Board

- Alberta and Southern Natural Gas Application

Individual hearings are dealt with in greater detail in Appendix "A".

OIL

The Ministry has been deeply involved with the federal and other provincial governments in oil pricing discussions designed to rationalize the objectives of reasonable price and continuing supply. The Ministry has taken a middle-of-the-road course based on the need to ensure uninterrupted exploration of new and essential oil supplies while at the same time keeping the amount of the price increase gradual and reasonable, so as to minimize the economic impact on the Ontario consumer. As an adjunct to this involvement, the Ministry conducted an extensive review of the need to administer or control the prices of petroleum products in the Province.

NATURAL GAS

A comprehensive policy statement was issued, by the Minister, on September 4th, 1974, which reviewed the Government's activities and goals with respect to natural gas supply, demand and price. Among the stated goals were:

- prices that are reasonable for both consumer and producer
- adequate natural gas supplies now and in the future
- an efficient and rational natural gas supply, transportation and distribution network

Adequate supplies for the future require the timely connection of supplemental supply sources to Ontario markets. To assist in attaining this objective the Government has requested the Ontario Energy Board to advise on the appropriate manner in which natural gas consumers can contribute to adequate supplies for the future by permitting investment by distribution utilities in new projects such as the proposed frontier pipelines.

The Ministry has also prepared draft legislation for a natural gas allocation scheme that could be implemented in the event that natural gas supplies are insufficient to meet demand in Ontario prior to the connection of new supply sources.

COAL

In order to reduce our total reliance on United States sources and to improve the degree of self-sufficiency in coal in Canada, the Ministry has been working with Ontario Hydro to increase the movement of coal from Western Canada and Nova Scotia to Ontario.

The desire of this Ministry for an assessment of possible coal areas in Northern Ontario is being realized as the Ministry of Natural Resources is pressing ahead with planning and contract tendering for a road access and exploratory drilling program to test the Cretaceous Basin in the Hudson Bay lowlands in 1975. The only known coal deposit in Ontario is located at Onakawana, southwest of James Bay. Proposals are being considered for the use of this coal.

The sudden interest in coal and the desire to use Canadian supplies has focused the Ministry's attention on the need for research and development throughout the coal delivery system, including mining, transportation and utilization.

URANIUM

Since the release of a joint report by the Minister of Energy and the Minister of Natural Resources on March 26th, 1974, which outlined the Government's uranium policy, the Ministry has worked closely with Ontario Hydro and the Federal Government on the establishment of uranium export controls. The controls which were designed to provide protection of long-term uranium needs of Canadian utilities, became effective on September 5th, 1974.

The Ministry has also pressed the Federal Government on other matters within their jurisdiction, notably the relaxation and clarification of foreign ownership legislation in the uranium industry.

In view of export commitments for uranium, the need for exploration cannot be minimized. Therefore, a recommendation regarding encouragement of uranium exploration contained in the policy statement of March 26th, 1974, is being vigorously pursued.

SOLAR

A commitment has been made through the Ministry of Housing's Energy Management Program to erect a demonstration house heated by solar energy. Partial funding was negotiated with the Ministry of State for Urban Affairs.

WINDPOWER

In addition to the review being conducted in conjunction with the Electrification of Northern Communities Program, next discussed, recommendations for further feasibility assessment in the next fiscal year have been made.

ELECTRIFICATION OF NORTHERN COMMUNITIES

In keeping with the commitment in the Speech from the Throne of March 5th, 1974, and on the Ministry's recommendation, an inter-ministerial Task Force is charged with the responsibility for establishing a plan for the orderly electrification of selected remote communities not covered by the Department of Indian Affairs and Northern Development (DIAND) program. The plan will be implemented by Ontario Hydro. As a possible alternative to diesel generators, the Ministry is investigating the application of windpower in communities currently without electric power.

A project to supply line power to Moosonee was considered and is currently under construction. The line is scheduled to provide its first power by mid-November, 1975.

ONTARIO ENERGY MANAGEMENT PROGRAM

No single government Ministry can hope to have a significant impact on ensuring the wise utilization of energy through its efforts alone. The Government's Energy Management Program, which is co-ordinated by the Ministry of Energy, comprises the efforts of the Ministries of Agriculture and Food, Colleges and Universities, Consumer and Commercial Relations, Education, Environment,

Government Services, Housing, Industry and Tourism and Transportation and Communications.

The stated policy of the Government is to take strong effective action to ensure that the growth in demand for energy throughout the provincial economy is considerably reduced in the years ahead. The objective is to moderate the present rate of growth in energy consumption in Ontario by one-third over the next five years.

The major emphasis this year has been addressed to space conditioning projects which involve the improvement in efficiency of heating, ventilation, air conditioning and lighting practices. It is planned to provide operational management assistance to industry, business and commerce, construction and transportation sectors. Technical demonstrations will be used to illustrate to the public and all the economic sectors, the practical and proven applications of existing and new energy saving technology.

ONTARIO HYDRO RATE REVIEW PROCESS

The Ministry has been concerned with the development of procedures for the review of rate increases proposed by Ontario Hydro. In line with the recommendations in the Report of Task Force Hydro and as presently provided for in the Ontario Energy Board Act, Section 37a, rates proposed by Ontario Hydro are subject to a review process which provides the citizens of Ontario with full information regarding the cost of electrical service in the Province. The review process

begins eight months before the rate change can be instituted. The Ontario Energy Board makes its final report to the Minister of Energy four months before any proposed changes can go into effect in order that the Minister will be fully advised of all the factors involved and the publicly expressed views of the intervenors.

The Minister of Energy refers the Ontario Energy Board report to Ontario Hydro for consideration and response, prior to implementation of any rate adjustments.

PROVINCIAL STEERING COMMITTEE ON THE RESTRUCTURING OF PUBLIC UTILITIES

The restructuring of the long established municipal electrical system in Ontario has been a concern of the Ministry. To provide a mechanism for resolution of the issue, the Government appointed an Electric Utilities Restructuring Steering Committee as recommended in the report by the Government Committee on Restructuring of Public Utilities. The purpose of the Committee is to act as a co-ordinating group and to establish local study teams in each regional area where there have been changes in the municipal boundaries. The local study teams are composed of municipal government, regional government, the municipal hydro and labour representatives from each area. When the local studies are completed, they will form the basis for amended legislation to provide for the regrouping of municipal hydro utilities in restructured municipalities.

ONTARIO HYDRO

In accordance with the provisions of the Power Corporation Act, the Ministry has responsibility for the sponsorship of submissions made to the Government by Ontario Hydro. The Ministry has been involved in obtaining approval for the following:

- ONTARIO HYDRO SHORT-RANGE EXPANSION
PLAN, 1977 - 1982

The Government has given approval-in-principle to Ontario Hydro's plan for expansion of the generating system for the period 1977 - 1982. The plan includes generating stations at Wesleyville, Pickering "B", Bruce "B", Darlington, Thunder Bay and a new site at Atikokan.

A transmission line from Bradley Junction to Georgetown on the 500 KV network has been approved. A study for a 250 KV line in Prince Edward County has been completed and the report made public. A public participation process designed to assist in determining generating sites and transmission line locations was also approved.

- ONTARIO HYDRO LONG-RANGE EXPANSION
PLAN, 1982 - 1992

In order to fully acquaint the public with Ontario Hydro's plan for expansion of the electrical system, the Government

has appointed Dr. Arthur Porter to head a Commission which will examine evidence presented by Ontario Hydro regarding the need for expansion. The findings of the Commission will be used as a guideline for future expansion of the Hydro system for the years 1982 - 1992.

ONTARIO ENERGY CORPORATION

The Ministry of Energy introduced legislation which became effective February 28th, 1975, thereby creating the Ontario Energy Corporation.

The purpose of the Ontario Energy Corporation is to participate in energy-related projects in order to further the assurance of adequate and secure supplies of energy for Ontario. The Corporation will eventually fulfill this function as a financially self-supporting and commercially viable enterprise.

An investment based on a five percent equity in Syncrude represents the first venture of the Ontario Energy Corporation. Support of the Syncrude project is critical to the on-going development of the enormous potential reserves in the oil sands of Alberta. Ontario stands to benefit directly in terms of industrial activity and related employment to be generated by the project.

The Syncrude consortium serves to illustrate the extent to which the private and public sectors can co-operate in the development of our energy resources. Furthermore, this partnership of the Governments of Canada should lead to better understanding and strengthening of the bonds of Confederation.

FEDERAL AND PROVINCIAL ENERGY HEARINGS

INTERPROVINCIAL PIPELINE LIMITED

The Ministry participated as an intervenor in hearings before the National Energy Board on the proposed construction of the Interprovincial Pipeline extension from Sarnia to Montreal. At this hearing a Certificate of Public Necessity and Convenience was issued authorizing the construction of the Sarnia to Montreal Pipeline extension. While not objecting to the pipeline, the Ministry, in conjunction with other Ministries, proposed a number of environmental guidelines relating to pipeline construction practices in the Provinces. The guidelines are designed to protect the rights and property of land owners and to preserve the natural resources and environment of the province. It is felt that these guidelines will influence future pipeline construction in Ontario and Canada.

OIL EXPORT HEARINGS

At these hearings the Ministry provided input to a complete review by the National Energy Board of the supply and demand outlook for Canadian crude oil. Also at issue was the establishment of a mechanism for the control and regulation of exports to the U.S.A. These hearings were the basis for a report released by the National Energy Board in December, 1974.

NATURAL GAS

During the fiscal year, the Ministry participated in two National Energy Board hearings relating to natural gas. The first concerned the pricing of gas being exported under existing licences and resulted in the National Energy Board recommending higher prices for the export of gas. The second was aimed at the determination of supply and deliverability of Canadian natural gas in relation to reasonably foreseeable domestic requirements as well as the potential for export.

TRANSCANADA PIPELINES LIMITED

The Ministry was represented at several National Energy Board hearings involving TransCanada PipeLines applications. The hearings covered three broad categories:

- measures tending to increase the supply of gas
- additional facilities applications
- rate increase applications

Also in the first category was an application to include approximately eight million dollars of research and development expense in the rate base. This development expenditure was related to coal gasification projects using Western Canadian coal. The Ministry supported this application as a means of developing additional gas supply.

Included in the first category, but in conjunction with an application for an increase in rates to reflect the increased cost of gas purchased in Alberta, there was an application by TransCanada PipeLines for approval of a clause in its tariff permitting it to accumulate periodically surpluses (or deficits) on gas purchase costs. The Ministry supported this clause in the interest of stimulating the attainment of additional gas supply. The National Energy Board did not accept either proposal.

In the second category was an application by TransCanada PipeLines for approval to enlarge its delivery system to enable additional gas to be sold directly by Pan Alberta Gas Limited for delivery to Manitoba and Quebec. This had serious implications for Ontario. The Ministry opposed this application on two grounds:

- (a) potentially diminished security of supply to Ontario
- (b) the imprudency of constructing added facilities which would soon be under-utilized due to supply difficulties in Western Canada.

Over the objections of the Province, the National Energy Board granted the certificate and approved the construction of the new facilities. The Ministry took further proceedings in the Federal Court of Appeal in an attempt to reverse the National Energy Board decision; however, these proceedings were not successful.

In the last category was an application by TransCanada PipeLines to increase its rates. The National Energy Board set out to determine the cost of gas which TransCanada PipeLines sells to Ontario distributors, with particular reference to the methods used by the company to calculate its tax expense and its rates of depreciation on pipeline and equipment. The Board accepted the Ministry's position that adopting new methods that would increase the cost of gas to the Ontario distributors was not necessary at this time.

DOME PETROLEUM LIMITED

The Ministry intervened at a National Energy Board hearing of the Dome Petroleum Limited ethane application. This concerned an application by Dome Petroleum Limited to vary its licence in order to increase the total amount of ethane (which is extracted from natural gas) which would be permitted to be transmitted south of the Great Lakes. The application contemplated increased imports at Sarnia, and increased exports at Windsor, with net effect being an increase in exports of 0.5 TCF of ethane to the U.S.A. Ontario questioned the economic and financial feasibility of the application. The National Energy Board approved the increase, but only to the extent of 0.2 TCF, basing its decision on a revised estimate of Canadian natural gas reserves.

LOWELL GAS LIMITED

The National Energy Board heard an application by Canadian Lowell Limited, to import gas into Canada and inject it into storage in the Union Gas Limited

facilities for use during periods of peak demand. The Ministry of Energy intervened to urge that the import licences be subject to review on a periodic basis in order to ensure that adequate storage facilities be always available for Ontario consumers. (The gas in question in the application was U.S. gas imported for storage only and to be exported again for use in the U.S. market during winter peak demand). The National Energy Board recommended that priority be given to Canadian storage requirements at all times.

UNION GAS LIMITED, CONSUMERS' GAS COMPANY, NORTHERN
AND CENTRAL GAS CORPORATION LIMITED

The Ministry of Energy was responsible for retaining counsel for the Ontario Energy Board for the hearings of applications for rate increases by Union Gas Limited, Consumers' Gas Company and Northern and Central Gas Corporation Limited. At these hearings orders were sought not only for higher rates but also for other charges for the sale and distribution of gas and, in the case of Union Gas Limited, for transmission and storage as well. Rate increase orders were made for amounts approved by the Board, largely due to the increase in the cost of gas arising in Western Canada and passed on to these Ontario gas distributors through higher rates approved for TransCanada PipeLines by the National Energy Board.

ENERGY RESOURCES CONSERVATION BOARD

In addition to its appearances before the National Energy Board and the Ontario Energy Board, the Ministry intervened in an application before the

Energy Resources Conservation Board of Alberta. The Alberta and Southern Gas Company requested approval to add additional gas fields to their existing removal permits. In view of a potential domestic shortfall of gas, the concern of the Ministry related to the possibility that this additional supply would go to export or be locked into the Alberta and Southern Gas Company system. The Energy Resources Conservation Board refused to approve the application.

HYDRO RATE REVIEW

The Minister of Energy was responsible for retaining counsel for the Ontario Energy Board in connection with public hearings on a rate increase application proposed by Ontario Hydro to take effect on January 1st, 1975. In question were the wholesale rates to be charged to municipal corporations and municipal electric utility commissions and to industrial customers having an average annual power demand of 5,000 kilowatts or more. The Minister also referred to the Board for report, certain other matters affecting Ontario Hydro's rates, namely:

1. The policies and practices respecting expansion of the Ontario Hydro power system, including the Generation Development Program for the period 1977 - 1982, which was approved in principle by the Government of Ontario in June, 1973, subject to review; and
2. The financial policies of Ontario Hydro together with financial objectives.

The reports mentioned above were made to the Minister in August of 1974. The Ontario Energy Board accepted for the most part Ontario Hydro's rate increase proposals and recommended that they be somewhat reduced and made certain other recommendations most of which were accepted by Ontario Hydro and which led to the development of further ongoing areas of study related to Ontario Hydro's rates and system expansion.

During the period covered by this Report, the Ministry has been involved in preparatory work for the following forthcoming hearings:

- Mackenzie Valley Pipeline Hearing
- Interprovincial Pipeline Limited
Tariffs Application and Rate
Structures
- Quebec Hydro Power Export Application
- TransCanada Pipelines Rate Hearings
- 1975 Oil Deliverability Hearing at
which the Ministry called witnesses
to describe the Ontario Energy
Management Program and feasible con-
servation measures to reduce the
demand for oil.



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ANNUAL REPORT
OF THE
MINISTRY OF ENERGY

YEAR ENDED MARCH 31, 1976



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Ministry of
Energy

416/965-4286

Queen's Park
Toronto Ontario

October, 1976

TO THE HONOURABLE PAULINE M. MCGIBBON
O.C., B.A., LL.D., D.U. (OTT)

Lieutenant-Governor of the Province of Ontario

MAY IT PLEASE YOUR HONOUR:

I take pleasure in submitting the Third Annual
Report for the Ministry of Energy for the fiscal
year ended March 31, 1976.

Respectfully submitted

A handwritten signature in dark ink, reading "Dennis R. Timbrell". The signature is written in a cursive style with a long horizontal line extending from the end.

Dennis R. Timbrell
Minister



e of the
ty Minister

Ministry of
Energy

Queen's Park
Toronto Ontario

July, 1976

TO THE HONOURABLE DENNIS R. TIMBRELL
Minister of Energy, Ontario

Sir:

I have the honour to present the third Annual
Report of the Ministry of Energy for the fiscal
year ended March 31, 1976.

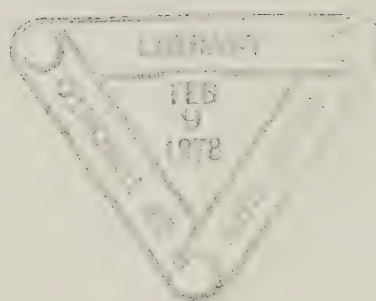
Respectfully submitted

Malcolm Rowan

Malcolm Rowan
Deputy Minister

ANNUAL REPORT

Year Ended March 31, 1976



MINISTRY OF ENERGY

ANNUAL REPORT

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DEPUTY MINISTER'S SUMMARY

Established in 1973, the Ministry of Energy has just completed it's second full year of operation. During this time, the Ministry has made a significant contribution to Canada's evolving energy policy.

During this period also, and particularly so in the past year, the Ministry has evolved to the point where new goals and new directions are needed and are being established.

Based on the concepts recommended by the Committee on Government Productivity and Task Force Hydro, the Ministry of Energy comprises a Ministry Office, Ontario Hydro, the Ontario Energy Corporation and the Ontario Energy Board. These latter three agencies of Government report to the Minister of Energy.

The Ministry Office includes some 44 professional and support staff. It is this Office which develops energy policy recommendations for the Government and provides policy guidance for the Ministry's Agencies.

During the past year, energy supply matters dominated the activities of the Ministry, including involvement in negotiations leading up to the Ontario Energy Corporation's participation in Syncrude Canada Limited and Polar Gas Project.

The Ministry, through the Ministry Office, was also vitally involved in the national crude oil and natural gas pricing negotiations which materially affect this Province. Similarly, interventions before the National Energy Board, designed to enhance Ontario's supply position and the Province's influence on national energy policy generally, were key elements of the Ministry's supply policy over the past year.

However, the energy challenge facing Ontario is to maintain an appropriate balance between energy supply and energy demand.

Of equal importance to energy supply, and as part of a balanced energy policy, is the role of the Ministry with respect to energy demand. Here, the Ministry, through its Ministry Office, the Ontario Energy Board and Ontario Hydro, is playing an increasingly active role in the development of policies and programs designed to conserve energy. This area will be given even greater emphasis in the coming year.

Since 1970, the Government of Ontario has established, or is in the process of modifying, the principal elements of the institutional framework within which energy policy is formulated. In 1975, three special-purpose bodies were established by the Government to review various energy-related issues - the Select Committee on Hydro Rates, the Royal Commission on Petroleum Products Pricing and the Royal Commission on Electric Power Planning. The findings of

these inquiries are expected to add considerably to the understanding of the energy scene and to the refinement of the structure and process of energy decision-making in Ontario.

In addition to this Annual Report, separate reports will be published by Ontario Hydro, the Ontario Energy Board and by the Ontario Energy Corporation.

ROLE OF THE MINISTRY

Prior to the oil embargo of 1973, the Ontario Government recognized that significant changes with respect to energy should be anticipated. The June, 1973 report to the Premier by his Parliamentary Assistant, the Honourable W. Darcy McKeough, emphasized the need for Ontario to moderate its energy demands through efficiency and conservation as well as to assure that adequate supplies of energy will be available to the Province. Legislation establishing the Ministry of Energy to discharge these responsibilities was formally proclaimed on July 3, 1973.

The over-riding fact in the energy situation in Ontario is our reliance on sources beyond our provincial boundaries for about 80% of our energy requirements. In this context the Ministry of Energy is responsible for the development and implementation of a provincial energy policy which is designed to ensure that Ontario consumers receive an adequate and secure supply of energy at reasonable prices with an acceptable environmental impact.

To discharge this role the Ministry consists of a Ministry Office and three Government agencies; the Ontario Energy Board, the Ontario Hydro Corporation, and the Ontario Energy Corporation.

The role of the Ministry Office is to provide support to the Minister in developing and effecting energy policy. This role involves the following functions or missions:

1. To review energy matters,
2. To advise on energy policy,
3. To apply energy policy through the co-ordination of the Government's energy related activities and through interventions before Provincial and Federal tribunals,
4. To interpret Government policy to the Ministry agencies, to co-ordinate these agencies in terms of Government policy and to serve as a link between the Ministry agencies and other Ministries.

In carrying out it's responsibilities, the Ministry Office works in close co-operation with Ontario Hydro, The Ontario Energy Board and the Ontario Energy Corporation,^{*} and officials of other Ministries of the Ontario Government. The Ministry Office is able to operate with a relatively small staff and was organized initially into four inter-dependent, but nevertheless distinct groups. Because of the evolving role of the Ministry, the organization of the Ministry Office is also undergoing changes. During 1975/76, however, the functional responsibilities of the four groups making up the Ministry Office were as follows:

* Annual Report available from
Ontario Hydro Corporation, 10th floor,
700 University Avenue, Toronto.

Annual Reports for the Ontario Energy Corporation and the Ontario Energy Board available from Ontario Government Bookstore, 880 Bay Street, Toronto.

1. Policy Development Group

This group works on the development of Provincial energy policy and has special responsibility for:

- monitoring of the crude oil, natural gas, thermal and metalurgical coal, uranium, petro-chemicals and petroleum products and electrical sectors;
- ongoing review of the programs and activities of the Ministry to identify and make preliminary evaluation of new issues which may require further attention;
- Hydro affairs.

2. Information and Analysis Group

This staff support group has special responsibility for:

- maintenance of data base and information for Ministry use;
- provision of economic, financial, statistical, management science and systems analysis capability in support of Ministry programs;
- development and adaptation of models including energy demand analysis models suitable to Ontario requirements.

3. Energy Technology Group

- ongoing review of the state of the art in the energy technology sector;
- coordination of the Government's Energy Management (Conservation) Program;
- evaluation of energy research and development and the recommendation of Provincial programs.

4. Legal and Regulatory Affairs Group

This group has special responsibilities for:

- provision of legal advice, counsel and solicitors' services to the Ministry;
- provision of legal support for the Ontario Energy Board;
- provision of counsel to represent the Province of Ontario at hearings before Federal and Provincial energy tribunals.

ENERGY PROGRAMS

Since its inception the Ministry has had three main programs:

1. Energy Policy
2. The Ontario Energy Board
3. The Ontario Energy Corporation.

For most of 1975/76 the Ministry operated under this program structure. However, it became increasingly apparent near the end of the year that the Ministry's emphasis would more accurately be reflected under a new program structure. This structure was in the process of being implemented at the end of the fiscal year. The new energy programs include:

1. Energy Conservation (Demand Management)
2. Energy Policy
3. Regulatory Affairs
4. Operations (Supply)

Each of these is discussed in more detail below.

A. Energy Conservation (Demand Management)

The Ontario Energy Management Program was established in March, 1975 to achieve a more efficient management of energy consumption in Ontario through voluntary conservation and the encouragement of an energy conservation ethic.

The long term goals of the Program are:

- to extend the life of non-renewable resources, particularly oil and natural gas;

- to reduce the environmental impact resulting from the use of energy;
- to reduce the need for capital investment in energy producing facilities;
- to reduce the impact of higher energy prices;
- to save money for those practicing energy management;
- to alleviate supply problems.

Eleven Government Ministries were involved in the Energy Management Program during 1975/76: Agriculture and Food, Colleges and Universities, Consumer and Commercial Relations, Education, Energy, Environment, Government Services, Housing, Industry and Tourism, Natural Resources and Transportation. Seventy different projects were undertaken to determine practical ways to moderate the annual rate of growth in provincial energy demand by one-third from historical growth rates, over the period to 1980. The method employed through the Program was to calculate and demonstrate potential economies to all sectors-- residential, commercial, industrial, agricultural and transportation. The budget was \$1.9 million.

The role of the Ministry of Energy in the Program was to coordinate the Government-wide activities, and to act as a research and information resource for other Ministries in their energy management projects. Each participating Ministry had a senior staff member responsible for the projects within his/her respective sector who represented that Ministry on an interministerial coordinating committee. The Energy Management team within the

Ministry of Energy resolved such matters as priorities, budget, overall policy, and reporting role.

The focus of the Program during 1975-76 was on the improvement of space conditioning systems (heating, ventilating, air-conditioning and lighting). Significant potential energy savings were identified through audits in a number of Government buildings and guidelines for optimum energy management in buildings were developed and issued. In addition a series of space conditioning seminars, attended by representatives of both public and private sectors from across the country, were sponsored by the Energy Management Program.

With encouragement from the Ministry of Energy improved insulation standards were included in the new Ontario Building Code (proclaimed January, 1976) and certain types of thermal insulation materials for use in existing residences gained exemption from retail sales tax in the 1976 Spring Ontario Government Budget.

Through the Energy Management Program the Ministry undertook the following specific investigations:

(i) District Heating

In 1974, Acres Shawinigan Ltd. was engaged to carry out a preliminary economic study on the feasibility of providing space conditioning and domestic hot water heating for a large community (i.e. District Heating) from a nuclear generating station. The final report of the District Heating Study was received in February, 1976 and indicated a distinct economic potential for District Heating

programs over the long term. However, the report also indicated that the initial capital required to build facilities is substantial.*

(ii) Wind Power

In November, 1975 the Ministry of Energy and Ontario Hydro completed a joint study of the application of wind power in Ontario.* Particular emphasis in the study was placed on the potential use of wind power to generate electricity as a supplement to diesel generators in remote northern communities, where the Province is installing telecommunications systems and the Federal Government community power systems. The study identified potential savings in some communities where telecommunications and community power supply is expensive due to high diesel fuel costs. A joint program to confirm these findings by technical demonstration is under negotiation with the Federal Government.

* This Report is available from the Ontario Government Bookstore, 880 Bay Street, Toronto.

(iii) Solar Energy

In order to investigate the potential for solar space and hot water heating in Ontario the Ministry and the Ontario Housing Corporation, financially supported the construction of Provident House, a totally solar heated home in King Township, north of Toronto. In addition, the Ministry and the Ontario Housing Corporation jointly conducted a design competition for a 30-unit solar heated senior citizen's apartment. At the end of the fiscal year a winning design had been selected and the tendering and construction in Aylmer was scheduled for 1976/77.

(iv) Thermography

In the Autumn of 1975 the Ministry carried out a study of the use of infrared imagery for detecting heat loss from the air. It then commissioned the Ontario Centre for Remote Sensing to fly over a number of designated regions to gather experimental data. This data is now being evaluated to determine the application of this technique to energy conservation.

Based on the experience gained in its Energy Management Program, even greater emphasis will be given to energy conservation during 1976/77.

B. Energy Policy

The development of energy policy recommendations is primarily the responsibility of the Policy Development Group in the Ministry Office, supported by Energy Technology and Information and Analysis Staff. In addition, and as appropriate, specific energy issues are referred by the Minister or Lieutenant Governor in Council to the Ontario Energy Board for the holding of public hearings.

During the past year the Ontario Energy Board, at the request of the Lieutenant Governor in Council, held public hearings to examine various aspects of customer support through rates for investment by Ontario gas distributors to secure future gas supplies for Ontario.

The energy policy activities of the Ministry in each energy sector are as follows:

a) Crude Oil

The Ministry's concern with regard to crude oil in Canada relate to both its price and supply.

As the National Energy Board report of September, 1975 confirmed, Canadian crude oil supply from conventional sources will decline by the end of the decade. Consequently, the Ontario Government has participated in the Syncrude Project, through the Ontario Energy Corporation, to extract crude oil from the Alberta tar sands. Further details of the project are outlined in the Annual Report of the Ontario Energy Corporation and under the Ministry's Operations Program (page 35).

With respect to crude oil pricing the Ministry expressed concerns as to the adequacy of the pricing method in practice in Canada, and undertook an examination of alternatives.

After a detailed study the Ministry put forward a new mechanism for pricing in Canada for discussion among the Provinces and Federal Government. The Ministry proposal was based on a series of principles, which indicated that any crude oil pricing mechanism should:

- contribute to secure and adequate supplies of crude oil from domestic sources;
- should not harm Canada's competitive position;
- should not impose severe costs on consumers of natural gas and oil products;
- should bear an appropriate relationship to the actual cost of producing the crude oil in question;
- should be fair from the perspective of the producing Provinces.

In essence, Ontario proposed that instead of simply raising the price of a barrel of oil a few dollars every year, Canada should have a price that bears a reasonable relationship to the cost of producing and delivering the crude oil, both that which is being currently produced and that which is being sought in remote frontier areas.

The Ministry is continuing to refine its proposal and consider other pricing mechanisms which might appropriately be instituted in Canada.

b) Refined Petroleum Products

Subsequent to the First Minister's conference in the Spring of 1975 the federal government announced that the Canadian price of crude oil would be increased by \$1.50 per barrel at the well-head. The Government of Canada proposed a 45 day delay in the introduction of this increase in gasoline and heating oil prices attributable to the increase in the field price of crude oil.

The Ontario government expressed concerns over the adequacy of the 45 day period and in early July 1975 introduced legislation to temporarily freeze prices on refined petroleum products sold in Ontario. Citing the public's concern about the supply and price of petroleum products in Ontario the government on the same day announced its intentions to appoint a Royal Commission to inquire into the pricing of petroleum products in the province.

The Commissioner was specifically directed to inquire into price increases of petroleum products sold in Ontario other than those directly attributable to the price of crude oil itself after the price freeze period. In addition he was directed to report on the relationship between any price increases and the interests of the consuming public with consideration to the adequacy

of the federal government's guidelines on the pass through of price increases as they applied to Ontario, the financial requirements of the industry, existing inventories, and the continuity of supply.

The commissioner made his first report on September 30th, 1975 and made available a supplement to the first report on January 14th, 1976.

The final report of the Commission was not available as at the end of the year under review in this report.

c) Natural Gas

A comprehensive policy statement concerning natural gas matters was issued by the Minister of Energy on September 4, 1974, and was updated and refined in the context of a subsequent statement on October 2, 1975. These statements reviewed the Government's activities and goals with respect to natural gas supply, demand, transport and price.

Because of the Ministry's concern for adequate future supplies of natural gas the Ontario Energy Corporation became a member of the Polar Gas Project on September 1, 1975. This Project is studying the feasibility of bringing natural gas by pipeline from the eastern Arctic islands to markets in southern Canada. Further details are outlined in the Annual Report of the Ontario Energy Corporation and under the Ministry's Operations Program (page 35).

Adequate supplies for the future require the timely connection of supplemental supply sources to Ontario markets. To assist in attaining this objective the Government requested the Ontario Energy Board to advise it on the appropriate manner in which natural gas consumers can contribute to adequate supplies for the future, by permitting the investment by Ontario natural gas distribution utilities in new projects such as the proposed frontier pipelines.

The Board's report to the Ministry was released in March, 1976.

d) Coal

The Ministry continued to encourage the diversification of coal supplies from the United States in order to reduce Ontario's total reliance on U.S. sources and the Ministry Office made representations to the Alberta Government in support of Ontario Hydro contract negotiations for the initial movement of Alberta coal to Ontario.

The Ministry's desire for an assessment of possible coal deposits in northern Ontario was realized through preliminary surveys of the lignite potential in the James Bay lowlands, carried out by the Ministry of Natural Resources. The surveys have indicated selected areas for further exploration as part of the coal inventory program in Ontario.

In addition, Ministry officials participated in Federal/Provincial meetings on coal conversion and other related research and development matters.

e) Uranium

A reassessment of the uranium supply and demand situation confirmed the need for increased exploration activity in Canada. During the year, Ontario Hydro, with the Ministry Office's support, entered into two joint-venture programs to explore for uranium in selected areas in Ontario, Saskatchewan and the North West Territories.

The Ministry Office continued to work closely with the Ministry of Natural Resources and Ontario Hydro in reviewing reserve appraisals and changes in uranium requirements.

f) Electrical Sector

(i) Policy Direction and Project Approval

The Ontario Hydro Corporation is the agency of the Government reporting to the Minister of Energy which is responsible for the delivery of electrical power supply in Ontario. While the Ontario Hydro Board is directly responsible for the operation of the electric power system, policy direction from the Government is given to the Corporation by the Minister of Energy.

The Minister makes recommendations to Cabinet concerning Hydro's expansion plans, which require final approval of the Lieutenant Governor in Council. During the past year this procedure has involved the following projects:

- Extension of Thunder Bay Generating Station,
- Purchase of land for Atikokan Generating Station,
- Construction of the Bruce "B" Generating Station,
- Purchase of land for Middleport - Pickering 500 Kilovolt Transmission Line,
- Purchase of land for and construction of Bradley-Georgetown 500 Kilovolt Transmission Line,
- Construction of Prince Edward County 230 Kilovolt Transmission Line,
- Construction of Lennox to Oshawa 500 Kilovolt Transmission Line.

(ii) Ontario Hydro Bulk Power
Rate Review 1976

In the spring of 1975 Ontario Hydro submitted its proposal to the Minister of Energy to increase by about 30% the bulk power, or wholesale rates it proposed to charge in 1976 to the 353 municipal electric utilities and its 99 direct industrial customers having an average monthly power demand of 5,000 kilowatts or more.

Under the terms of the Ontario Energy Board Act the Minister referred the proposal to the Ontario Energy Board for public review. The hearing commenced on June 9th, 1975.

The provincial "Supplementary Actions to the 1975 Ontario Budget" of July 7th contained policy directives to Hydro on administrative and capital costs resulting in a re-submission on July 31st by Hydro's Board of Directors of a reduced rate request for a 25% increase.

The Ontario Energy Board report was submitted on October 10th and found that Hydro's cost estimates were reasonable and a 26.6% increase was justifiable.

The Board's recommendations are not binding on Ontario Hydro. On October 22nd, Hydro advised the Minister that it intended to implement rate increases of about 25% in accordance with its amended proposal.

(iii) Select Committee of the Legislature
Inquiring into Ontario Hydro's Bulk
Power Rates

On October 30th the Hydro proposal and the Ontario Energy Board report were referred to a Select Committee of the Legislature for review in light of the then recently announced Federal Anti-inflation Program and Ontario's commitment to it.

In its interim report of December 12th, 1975 the Select Committee recommended a 22% increase to be effective on January 1st, 1976. This recommendation was accepted and implemented by Hydro.

The final report of the Select Committee had not been submitted as at the end of the year under review in this report.

(iv) Expropriation Approvals

On June 1, 1975 the responsibility for the approval of expropriation of land for purposes of Ontario Hydro was transferred from the Minister of Environment to the Minister of Energy. During the year, the Minister of Energy authorized approval of expropriation of land for the following projects:

- Darlington Generating Station
- Middleport Junction - Milton Transmission Line
- Bradley Junction - Georgetown Transmission Line

(v) Electrification of Northern
Communities

A project to supply line power to Moosonee was completed by mid-November 1975, and power was available to Moose Factory by January 7, 1976. This project came within the context of the Government's program for the electrification of northern communities.

(vi) Restructuring of Municipal Utilities

In April 1975 a Provincial steering committee was established to oversee the restructuring of municipal electric utilities. The purpose of the committee was to act as a coordinating group and to establish local study teams in each regional area where there had been changes in the municipal boundaries. The Committee set up five local study teams in the regions of Waterloo, Peel, York, Niagara and Sudbury. Preliminary discussions have been held with the municipal councils and hydro utilities in the regions of Durham, Halton, Hamilton/Wentworth, Haldimand/Norfolk, and the restructured Oxford County.

It is expected that the Waterloo study team report will be completed later in 1976 and that enabling legislation will be introduced into the Legislature in the fall session.

(vii) Ontario Hydro Long Range Expansion
Plan 1983-1993

In March 1975, the Government established the Royal Commission on Electric Power Planning to fully examine the long-range planning concepts of Ontario Hydro for the period 1983 to 1993 and beyond.

A series of preliminary public meetings were held throughout the Province during the latter part of 1975 and in early 1976.

The Royal Commission is expected to make its final report to the Government through the Provincial Secretary for Resources Development late in 1977.

g) Federal and Provincial Energy Hearings

To protect the interests of Ontario energy consumers by promoting the lowest possible prices consistent with adequate and secure supplies, the Ministry office intervened at hearings before Federal and Provincial regulatory agencies concerned with energy matters. The Ministry's interventions effectively placed Ontario's perspective before these regulatory bodies and included:

TransCanada PipeLines Limited

The Ministry was represented at three hearings involving TransCanada PipeLines Limited applications;

(i) Facilities - Before the National Energy Board

The hearing in August 1975 concerned an application for approval to complete looping of the Toronto-Montreal portion of the mainline natural gas transportation system and also complete looping from that line to Ottawa. At the hearing, the Ministry supported the application but urged the Board to require adherence to construction practices which would minimize the detrimental impact on the natural environment in general, and agricultural land in particular. The guidelines which the Ministry proposed, and which were largely adopted by the Board, required a training program for field personnel, implementation of the recommendations of the environmental consultants, field inspection during construction, immediate restoration of affected areas, and monitoring and surveillance after construction.

(ii) Transmission Rates - Before the National
Energy Board

The hearings for the TransCanada PipeLines rates applications were divided into two Phases. Phase I was completed in fiscal year 1974/75. Phase II, Part 1, which took place from August to October, 1975 involved proposals by TransCanada PipeLines to raise the depreciation rate on its capital equipment from 2% to 4%, and to change from flow-through to normalized income tax accounting. Both measures potentially involved a substantial cost of service increment to the ultimate consumer. TransCanada PipeLines sought to justify the increase in rate of depreciation on the basis that natural gas supply would run out before the end of the useful life of the capital equipment, thereby shortening its "economic life". The Ministry submitted that TransCanada PipeLines did not take into account potential supplies from frontier areas and took an inordinately pessimistic view of its ability to contract for natural gas surplus to Alberta requirements in the future. With regard to normalized tax accounting, the Ministry intervention endeavoured to establish that, under such a system, consumers would be paying now for taxes which might never be payable.

In keeping with its policy of opposition to any increase in natural gas prices which could be avoided or deferred, the Ministry cited inflation and unemployment problems in support of its strong objection to approval of either TransCanada PipeLines proposal. Subsequently, the Board allowed a slight increase in the depreciation rate from 2% to 2 3/4% and disallowed the application to change the method of accounting for income taxes.

The Ministry intervention in Part 2 of Phase II of the hearings regarding the determination of rates and tolls in respect of Canadian natural gas sales and transportation services, was limited in its scope and dealt mainly with establishment of a proper rate of return. Ontario submitted that no evidence had been presented which would justify an increase in the allowed rate of return to 11%. The Board decision limited the rate to 10.2%, finding that to be "just and reasonable".

(iii) Gas Removal - Before the Energy Resources
Conservation Board of the Province of Alberta

The hearing, concerning an application for a permit to remove additional quantities of natural gas from Alberta, had the full support of the Ministry in the interest of security of supply. After the hearing which took place in January, 1976 the Alberta Government approved the previously applied for TransCanada PipeLines Limited removal permit.

2. Mackenzie Valley Pipeline Hearings - Before the
National Energy Board

The hearings, which began in the autumn of 1975 and continued throughout the fiscal year, concerned alternate proposals to build a natural gas pipeline along the MacKenzie Valley connecting northern reserves with southern markets. In the interest of minimizing the possibility of a short fall in supply, due to declining deliverability of Western Canadian reserves the Ministry continued to be supportive of proposals which it felt would result in the earliest possible connection of MacKenzie Delta reserves to Canadian markets within acceptable environmental, social and economic conditions. The Ministry is monitoring the hearings and is intervening in areas of direct interest with the aim of assuring that, whatever proposal is eventually certificated, it is economically, socially and environmentally acceptable. The hearings are continuing.

3. Gas Supply and Deliverability Hearing - Before
the Energy Resources Conservation Board of the
Province of Alberta

In September, 1975 the Board held a gas supply and deliverability hearing at which the Ministry maintained a watching brief, for information purposes, but did not intervene.

4. Saskatchewan Potash Litigation

The Ministry maintained a watching brief on the court action for information purposes, but did not intervene. The Ministry's interest in the proceedings concerned possible precedents relating to the ownership, pricing, royalty levels, etc. of natural resources.

5. Oil Supply and Requirements - Before the
National Energy Board

At the hearing in April 1975 the Ministry participated in the review of the supply and demand outlook for Canadian crude oil. Essentially designed to update the information obtained in the 1974 Oil Export Hearings, these proceedings resulted in both the Board and the industry adopting a slightly more conservative view of oil supply and producibility than was held a year prior to the hearings. In light of this fact, the discussion of conservation in which the Ministry participated with an explanation of its Energy Management Program, was particularly timely, and marked the first occasion on which conservation was a major issue in National Energy Board hearings.

6. Manitoba Hydro Export - Before the National
Energy Board

The hearing in January 1976, concerned an application by Manitoba Hydro for a certificate to construct a 230 Kilovolt line for interconnection with the Minnesota power system, and for licences to export firm power (power which is continually available on a non-interruptable basis) and interruptable power over a period from 1976 to 1986, to the U.S.A.

In keeping with Ontario's aim of providing the people of the Province with assured energy supplies at reasonable prices, the Ministry opposed the application on the grounds that approval of the export would retard development of interprovincial power system interconnections. Submitting that licences for export of firm power from Canada should only be issued on terms that provide for Canadian priority, the Ministry suggested that licences should be subject to periodic review by the Board, in order to ensure that Canada could repatriate power upon the termination of an export licence. In addition, the Ministry suggested licences for export of firm power granted to Manitoba Hydro be conditioned by a term requiring the licensee to offer the export power to Ontario Hydro annually.

The Board did not approve the licences for export of firm power and expressed agreement with the proposition that such power should first be offered, on the same terms as if exported, to other Canadian utilities. The Board also reduced the term of the licences for interruptible power from the proposed ten years to six, thereby ensuring a review at that time and thus recognizing the Ministry's concern.

7. Ontario Hydro Export - Before the National
Energy Board

At the hearing in March 1976, concerning an application for a licence to export interruptible power, the Ministry intervened in order to make its policy position regarding the export of power clear.

The Ministry supported the export of any available interruptible power which was surplus to Canadian needs on a day-to-day basis in order to obtain the benefits of improved quality of service, improved reliability and reduced cost of service to Ontario Hydro customers. But the Ministry also reiterated its opposition to the irrevocable export of firm power from Canada without giving first priority to Canadian customers.

C. REGULATORY AFFAIRS

The Ontario Energy Board is responsible for regulation of the natural gas utilities in the Province. The Board maintained a high level of regulatory activity throughout the year completing major hearings for Union Gas Limited and Consumer's Gas Company.

In addition to its regulatory role, and at the request of the Minister of Energy, the Ontario Energy Board reviewed at public hearings Ontario Hydro's 1976 Bulk Power rates. The Board also held public hearings into the question of rate based investments by the natural gas utilities.

Further information is given in the Board's Annual Report.

D. OPERATIONS (Energy Supply)

The Operations or Energy Supply Program essentially involves the activities of the Ontario Energy Corporation in crude oil and natural gas supply matters, and the Ontario Hydro Corporation in electrical supply matters.

a) Ontario Energy Corporation

The Ontario Energy Corporation was established in 1975 to participate in energy-related projects in order to further the assurance of adequate and secure supplies of energy for Ontario.

During the year the Corporation continued its negotiations with respect to its proposed five percent investment in the Syncrude Project, a project to extract crude oil from the Alberta tar sands. The Corporation also concluded an agreement to participate in the Polar Gas Project, which is examining the feasibility of bringing natural gas by pipeline from the eastern Arctic Islands to markets in southern Canada.

At the end of the Corporation's fiscal year on December 31, 1975, it had invested approximately \$22.4 million in both projects.

Further information is given in the Corporation's Annual Report.

b) Ontario Hydro Corporation

The year ended March 31, 1976 was extremely significant for Hydro in that borrowing constraints resulted in a reduction in its investment in its system expansion of some \$5.2 billion to 1985. During the same period the Corporation came under intense public scrutiny at the Ontario Energy Board hearings and the Select Committee of the Legislature Enquiring into Ontario Hydro's 1976 Bulk Power Rates.

Further information is given in Ontario Hydro's Annual Report.

INFORMATION AND ANALYSIS

While information and analysis is basically a support activity within the Ministry Office, a number of studies of particular significance are presently underway.

During the year the Ministry initiated a major study aimed at increasing its analytical capability in the quantification of Ontario's future energy demand and supply.

In November 1975 tenders were called on studies of energy demand in each of three sectors of the Provincial economy (industrial, transportation, residential/commercial).

The purpose of these studies is to develop analytical tools which will improve understanding of the structure of future energy demand and be useful in the analysis of policy issues associated with, for example, conservation and substitution of fuels. The purpose is not to develop forecasts based on extrapolation of historic trends but to develop estimates of consumption which follow from various possible assumptions concerning future developments. The factors considered range from those as broad as population growth and economic development to those as specific as insulation standards and vehicle weights.

Three consulting organizations were selected in early 1976.

- Acres Consulting Services Limited is working on the analysis of energy demand in the Industrial Sector.
- Informetrica Limited in association with the Energy Research Group at Carleton University

are providing an analysis of the Residential and Commercial Sectors.

- Canadian Resourcecon Limited are studying energy demand in the Transportation Sector.

The studies are expected to be complete by October, 1976 with implementation during 1977.

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**ANNUAL REPORT
OF THE
MINISTRY OF ENERGY**

YEAR ENDED MARCH 31, 1977



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outy Minister

Ministry of
Energy

Queen's Park
Toronto Ontario

July, 1977.

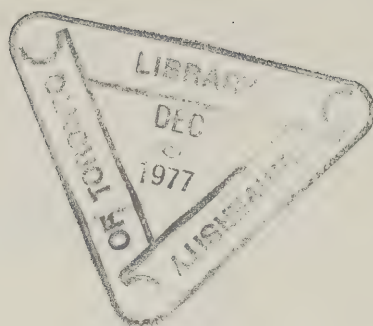
TO THE HONOURABLE JAMES TAYLOR, Q.C.
Minister of Energy, Ontario

Sir:

I have the honour to present the Fourth Annual
Report of the Ministry of Energy for the fiscal
year ended March 31, 1977.

Respectfully submitted

Malcolm Rowan
Deputy Minister





Office of the
Minister

Ministry of
Energy

416/965-4286

Queen's Park
Toronto Ontario

July, 1977.

TO THE HONOURABLE PAULINE M. MCGIBBON
O.C., B.A., LL.D., D.U. (OTT)

Lieutenant-Governor of the Province of Ontario

MAY IT PLEASE YOUR HONOUR:

I take pleasure in submitting the Fourth Annual
Report for the Ministry of Energy for the fiscal
year ended March 31, 1977.

Respectfully submitted

A handwritten signature in dark ink, appearing to read "James Taylor".

James Taylor, Q.C.
Minister.

ANNUAL REPORT

Year Ended March 31, 1977

MINISTRY OF ENERGY

ANNUAL REPORT

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DEPUTY MINISTER'S SUMMARY

In 1976/77, the Ministry of Energy took further initiatives in the fields of energy supply, and pricing and conservation, at the same time developing strategies geared to Ontario's long-term energy future.

Energy pricing continued to be a major concern. The Province vigorously opposed price increases for crude oil and natural gas on the arbitrary basis proposed by the Federal Government and the producing provinces.

Ontario proposed to the Federal Government and to the provinces a blended price system based on differences in cost of production of newly found versus existing crude oil. Regrettably, this proposal was not accepted and the Federal Government increased the price of crude oil in two steps -- on July 1, 1976, and January 1, 1977 -- for a net increase of \$1.75 per barrel. The Province will continue to oppose further arbitrary price increases in crude oil and natural gas during the coming year which are unrelated to the cost of production or which do little to ensure future energy supply.

The statutory review process of Ontario Hydro's bulk power rate increase proposal resulted in an Ontario Energy Board recommendation for a cost based increase of 30.3 per cent within the Anti-Inflation Board guidelines.

Also during the past year, the Minister of Energy referred the principles of costing and pricing of electricity to the Ontario Energy Board for public hearings.

The Select Committee on Ontario Hydro's 1976 Bulk Power Rates reported in June, 1976, and the Minister of Energy tabled the Government's response in October, 1976. The Minister indicated that the Government was in essential agreement with the Select Committee's recommendations, with very few exceptions, and the Legislature unanimously approved a motion proposed by the Minister.

Through the Ontario Energy Corporation, the Province expanded its commitment to energy supply with investments in the Syncrude and the Polar Gas Projects. Through Ontario Hydro, as a supplement to Hydro's conventional electricity supply program, the Ministry also expanded its Program of Electrification of Remote Northern Communities. Also, Ontario Hydro entered into joint ventures in uranium exploration and completed arrangements for a supply of coal from western Canada.

The Ministry intervened on behalf of Ontario consumers at hearings of the National Energy Board relating to pipeline tariffs and exports of crude oil, natural gas and petroleum products.

Several significant energy conservation and energy research, development and demonstration initiatives were undertaken in the past year. Large increases in funding for energy conservation were made in 1976/77 and further expansion will take place in 1977/78. This additional funding and an increase in the number of energy management projects was backed up by creation of an Energy Conservation Group in the Ministry Office.

Ontario's Energy Conservation Policy was tabled on October 29, 1976. Early in November, 1976, Energy Conservation Week highlighted the Ministry's public information campaign.

Ontario Hydro also established an energy conservation division during 1976, to be responsible for programs designed to reduce consumption of electrical energy and to reduce the need for the expansion of its system. Hydro is carrying out this responsibility in conjunction with the Ministry Office's Energy Conservation Group and with other energy utilities and companies so as to ensure a balanced and integrated approach to energy conservation.

The Ministry's estimates were reorganized into a functional program structure, including a new Energy Conservation Program. The new Ministry organization and program structure is shown in the appendix.

The Ministry undertook a review of Ontario's energy future as the basis for a report to the public and to provide a planning framework for specific initiatives. This report is to be released early in the coming fiscal year.

In addition to the Ministry's Annual Report, separate Annual Reports will be published by Ontario Hydro, the Ontario Energy Board and the Ontario Energy Corporation.*

- * Ontario Hydro Annual Report - Ontario Hydro, 700 University
Toronto, Ontario M5G 1X6
- Ontario Energy Board Annual Report - Ontario Energy Board, 9th Floor
14 Carlton Street, Toronto,
Ontario M5B 1K5
- Ontario Energy Corporation Annual Report - Ontario Energy Corporation,
4th Floor, 56 Wellesley Street
Toronto, Ontario M7A 2B7

ORGANIZATION AND ROLE OF THE MINISTRY

Prior to the oil embargo of 1973, the Ontario Government recognized that significant changes with respect to energy should be anticipated. A June, 1973 report to the Premier emphasized the need for Ontario to moderate its energy demands through efficiency and conservation as well as to assure that adequate supplies of energy would be available to the Province. Legislation establishing the Ministry of Energy to discharge these responsibilities was formally proclaimed on July 3, 1973.

The over-riding fact in the energy situation in Ontario is our reliance on sources beyond our provincial boundaries for about 80 per cent of our energy requirements. In this context the Ministry of Energy is responsible for the development and implementation of a provincial energy policy, which is designed to ensure that Ontario consumers receive an adequate and secure supply of energy at reasonable prices with an acceptable environmental impact.

To discharge this role the Ministry consists of a Ministry Office and three Government Agencies: the Ontario Energy Board, the Ontario Hydro Corporation, and the Ontario Energy Corporation.

The role of the Ministry Office is to provide support to the Minister in developing and effecting energy policy. This role involves the following functions or missions:

1. To review energy matters,
2. To advise on energy policy,
3. To apply energy policy through the co-ordination of the Government's energy related activities and through interventions before Provincial and Federal tribunals,
4. To interpret Government policy to the Ministry Agencies, to co-ordinate these Agencies in terms of Government policy and to serve as a link between the Ministry Agencies and other Ministries.

In carrying out its responsibilities, the Ministry Office works in close cooperation with Ontario Hydro, the Ontario Energy Board and the Ontario Energy Corporation, and with officials of other Ministries of the Ontario Government. The Ministry Office operates with a relatively small staff. Because of the evolving role of the Ministry, the Ministry Office was reorganized in 1976/77 into the following functional areas:

1. Policy Development

This Group is responsible for policy development in the following areas:

- crude oil;
- natural gas, thermal and metallurgical coal;
- uranium;
- petro-chemicals and petroleum products;
- electrical sectors, including relations with Ontario Hydro.

2. Information and Analysis

This staff support Group is responsible for:

- maintenance of data base and information for Ministry use;
- provision of economic, financial, statistical, management science and systems analysis capability in support of Ministry programs;
- development and adaption of models including energy demand analysis models suitable to Ontario requirements.

3. Energy Conservation

This Group is responsible for:

- development and coordination of the the Government's Energy Management (Conservation) Program;
- development of policies and programs in support of renewable energy, energy conservation, and related areas.

4. Energy Technology

This Group is responsible for:

- ongoing review of the state of the art in the energy technology sector;
- evaluation of energy research, development and demonstration and the recommendation of Provincial programs.

5. Legal Services

This Group is responsible for:

- provision of legal advice, counsel and solicitors' services to the Ministry;
- provision of counsel to represent the Province of Ontario at hearings before Federal and Provincial energy tribunals.

MINISTRY PROGRAMS

During 1976/77, the Ministry's program structure was reorganized into the following 4 programs:

- Energy Policy
- Energy Conservation
- Regulatory Affairs
- Energy Supply

See Appendix 1 for a comparison of the 1975/76 and the 1976/77 organizational and program structures.

ENERGY POLICY

The goals of the energy policy program derive their focus from the implications and impact that energy has on every facet of our social and economic environment.

As the predominant factor in shaping contemporary society, energy exerts an influence in the formulation of tax laws, transportation policy and community planning, as well as affecting decisions in the industrial and commercial sector. To a large extent, it also determines the lifestyle of the individual.

These and other considerations are implicit in the objectives of this program as follows:

- to review energy matters on a continuing basis, particularly as it relates to supply, demand, transport and price of energy resources to ensure adequacy and security of supply, fair and reasonable prices and acceptable environmental impact;
- to advise the Government on matters of policy;
- to represent the Government's policy position and protect its interest before Federal and Provincial regulatory authorities;
- to coordinate the energy related activities of the Government, including policy direction to Ontario Hydro and technical support to the Ontario Energy Board.

During the past year, the Ministry has taken the following energy policy initiatives:

Crude Oil

Crude oil price and supply continued to be major issues in 1976/77.

The Federal Department of Energy, Mines and Resources' 1976 report, titled "An Energy Strategy For Canada", cautioned that even with a move of domestic oil prices to current international levels -- a policy the Federal Government has vigorously pursued -- it is still possible that Canada could remain a net importer of oil through to 1990.

The Federal Government increased the price of crude oil by \$1.05 per barrel July 1, 1976 and another \$0.70 on January 1, 1977.

The Ministry's position on crude oil prices remains unchanged; it is opposed to any price increases given the economic circumstances existing in Canada today and opposed to increases unrelated to the cost of production and which do not serve to ensure future energy supplies for consumers.

Ontario does not reject higher prices simply for the sake of keeping prices down. Ontario rejects the concept of automatically increasing prices without regard for the future effect on Canadian supply costs and ultimately the Canadian economy. Ontario accepts the premise that energy costs will rise -- but they need not rise for oil (and natural gas) already in production at much lower costs. New supplies should be appropriately priced at a higher level, so as to bear a credible relationship to the higher cost of developing them.

Moreover, Ontario believes that any price increase should meet the following objectives:

- it should develop additional supplies of crude oil, natural gas, and, if need be, other sources of energy;
- it should protect the competitive position of Canada's industries;
- it should encourage the creation of new jobs;
- it should alleviate inflation; and,
- it should be equitable.

It was with these objectives in mind that in 1976 Ontario proposed to the Federal Government and to other Provincial governments a blended price system and vigorously advocated its adoption at the Federal/Provincial Energy Ministers' Conference.

Refined Petroleum Products and Petrochemicals

Petroleum product prices have continued to rise due primarily to increased crude oil costs plus higher labour and manufacturing costs. Nonetheless, the refinery industry in Ontario is highly competitive relative to other provinces.

The final report of the Ontario Royal Commission on Petroleum Products Pricing was submitted to the Lieutenant Governor in August, 1976, and concluded that the Ontario consumer is, in general, well served by the petroleum industry.

Two issues remain unresolved. The first relates to crude oil pricing and simply stated is: Does the consumer get value in the form of security of energy supply for the higher prices he is paying? The second is: What can be done about the comparatively weaker competition that exists in certain smaller communities throughout the province? Some progress has been made in both these areas, but continued effort is essential. With respect to the first issue, Ontario is continuing to take a strong stand in the interest of the consumer at Federal/Provincial pricing negotiations.

Differences in competition and depressed prices resulting from construction of additional petroleum and petrochemical capacities have widened the price differentials for the same product sold in various parts of the province.

Innovation, aggressive and highly competitive market conditions are anticipated to prevail in Ontario for the foreseeable future.

Since receiving the Royal Commission's report the Ministry has met on a number of occasions with oil company representatives to review their plans to improve efficiency and offer consumers attractive and competitive prices.

Natural Gas

Pursuing its objective of ensuring adequate future supplies of natural gas, the Ministry, through the Ontario Energy Corporation, continued its participation in the Polar Gas project. Application for this pipeline, to bring eastern Arctic inslands gas to southern Canadian markets, is expected in late 1977 or early 1978. Further details are provided in the 1976 Annual Report of the Ontario Energy Corporation.

Ontario's efforts at the 1976 Energy Ministers' Conference resulted in an increase in the existing pricing relationship between natural gas and crude oil despite strong pressure from producing provinces. As a result, the price of natural gas to the consumer (at the Toronto City Gate) was increased by the Federal Government only in step with the increase in the price of crude oil as determined by the Federal Government. Natural gas price remained at approximately 85 per cent of the heat content equivalent of the price of crude oil. It increased by 15.5 cents per MMBTU on July 1, 1976, and 10 cents on January 1, 1977.

The degree of the shortfall of natural gas anticipated in recent years has declined in the past year as a result of additional reserves becoming available in Alberta. Referred to as the "gas bubble", the extent of the additional supply is not clearly known at this time. It was, however, a factor in Canada being able to provide natural gas to parts of the United States on an emergency export basis during a crisis in the United States in the 1976/77 winter.

Though storage facilities in Ontario were utilized for these exports, there was ample supply for Ontario at all times. Ontario supports this assistance provided to the U.S. and suggests that the National Energy Board treat such emergency exports as accelerated or pre-deliveries on existing export licences and thus avoid major increases in total gas exported from Canada.

Coal

The Ministry's efforts to encourage diversification of coal supplies to include western Canadian sources met with success in 1976 following approval by the Alberta Government of the Ontario Hydro-Luscar/Sterco project. This and subsequent movements, beginning in 1978. will see at least 45 million tons of western Canadian coal shipped to Ontario over the next 15 years or so.

Alternative programs to determine the lignite fossil fuel potential of the James Bay Lowlands were investigated, as were alternatives for developing the known lignite deposit at Onakawana.

The Ministry participated in the Provincial-Federal consultative process initiative by the Federal Government, the end result of which is to be formulation of a Canadian coal policy tentatively scheduled for 1977.

Uranium

In its efforts to ensure an adequate long-term supply of uranium for Ontario, the Ministry in conjunction with the Ministry of Natural Resources and Ontario Hydro, continued to review reserve appraisals and monitor changes in uranium requirements.

Ontario Hydro's two joint-venture exploration programs entered into last year, with the support of the Ministry, are proceeding satisfactorily. The feasibility of entering into additional ventures is being considered.

Electrical Sector

(i) Policy Direction and Project Approval

The Ontario Hydro Corporation, an agency of the Government reporting to the Minister of Energy, is responsible for the supply of most electric power in Ontario.

While the Ontario Hydro Board of Directors is directly responsible for the operation of the electric power system, governmental policy direction is given to the Corporation by the Minister of Energy.

The Minister's presentation in July, 1976, to the Royal Commission on Electric Power Planning outlined the relationship between Ontario Hydro, the Government and the Ministry of Energy.

The Minister makes recommendations to Cabinet concerning Hydro's expansion plans, which require final approval of the Lieutenant Governor in Council. During the past year, this procedure has involved the following projects:

- construction of the Kleinberg to Woodbridge 500 Kilovolt Transmission Line (7 miles);
- construction of the 230 Kilovolt Transmission Line Newport Junction to Brantford Transformer Station (14 miles);
- construction of the 145 Kilovolt Transmission Line Westoner Junction to TransCanada PipeLine Station (1½ miles).

The Minister also makes recommendations to Cabinet concerning Hydro's interconnection agreements with neighbouring utilities. During the past year, agreements were approved with the following utilities for at-well-surplus power interchanges:

- Detroit Edison;
- Central Hudson Gas and Electric; and
- New York State Power Authority.

(ii) Expropriation Approvals

During the year, the Minister of Energy authorized approval of expropriation of land for the following Ontario Hydro projects:

- Bruce Generating Station - Owen Sound Transformer Station.
- Middleport (Junction 0) - Milton Transformer Station.
- Bradley - Colbeck, portion of Bruce G.S. - Milton T.S.
- Chatham Sub-Station - Sandwich Sub-Station realignment of six miles.
- Lennox Generating Station - Mt. Pleasant Junction.
- Lower Notch Generating Station - Nine Mile Junction.
- Newport Junction - Brantford Transformer Station.

(iii) Rates and Charges of Ontario Hydro

The Ontario Government, in support of the Federal Anti-Inflation Program, directed that Ontario Hydro rate increases should conform to the spirit and intent of the Anti-Inflation legislation and regulations and reflect only a pass-through of increased costs.

The Minister of Energy, in a letter to Ontario Hydro dated June 14, 1976, specified criteria to be used to demonstrate that its 1977 bulk power rates complied with the spirit and intent of the Federal program.

On June 25, 1976, Ontario Hydro submitted to the Minister of Energy its proposal to increase 1977 bulk power rates 31.9 per cent to the municipal utilities and 33.7 per cent to direct industrial customers. On June 28, 1976, the Minister referred the proposal to the Ontario Energy Board, and specified terms of reference to guide the Board in undertaking its review. Included in the terms of reference were the anti-inflation criteria earlier specified to Ontario Hydro.

The Ontario Energy Board undertook public hearings between August 3 and August 20 and reported to the Minister of Energy on September 30, 1976. The Board recommended that an average increase of 30.3 per cent was in order and in compliance with the Minister's anti-inflation criteria.

On October 19, 1976, the Chairman of Ontario Hydro informed the Minister that the Hydro Board had accepted the Energy Board's recommendation of a 30.3 per cent bulk power rate increase for 1977.

(iv) Select Committee of the Legislature
inquiring into Ontario Hydro's bulk
Power Rates

On June 13, 1976, the Select Committee reviewing Ontario Hydro's proposals to increase bulk power rates in 1976 tabled its report.

The report made forty recommendations regarding the financing, planning of new production and transmission facilities, energy conservation programs, and research and development activities of Ontario Hydro.

On November 9, 1976, the Government response to the recommendations of the Select Committee was tabled in the Legislature. With the exception of a very few recommendations, the Government fully endorsed the Select Committee's report. The Government response was adopted on November 9 by the Legislature.

(v) Northern Electrification

The Government's Program for the expansion of Electrification of Remote Northern Communities was announced on December 15. Both the federal Department of Indian and Northern Affairs (DINA)/Ontario Hydro Indian Community Electrification Program and the Ministry of Transportation & Communications (MTC)/Ontario Hydro Telecom Power Program were further implemented. Under these three programs, electric power is made available in locations in northern Ontario not presently served by the Ontario Hydro transmission system.

Under the Program for the Electrification of Remote Northern Communities, nine non-Indian communities in northern Ontario could qualify for provincial assistance to cover operating costs for local diesel generation or extensions to an existing transmission line. The Province's share of the three-year program is expected to be nearly \$3 million.

Under the terms of its agreement with the federal Department of Indian and Northern Affairs, Ontario Hydro is already installing and operating central diesel generating systems in remote Indian communities. During 1976, the number of communities receiving power under this program increased from five to eight.

Two more Indian communities will begin receiving power during 1977.

During 1973, the Ministry of Transportation and Communications (MTC) reached an agreement with Bell Canada to have telecommunication and telephone facilities installed in remote Indian communities. Ontario Hydro is the power supply contractor for such facilities using generators purchased by MTC. MTC committed about \$400,000 for these purchases during 1976 and the first six power systems were installed by Ontario Hydro. The 1977 commitment is for an additional ten systems. It should be noted that these generating facilities are devoted solely to the Bell Canada installations.

(vi) Municipal Hydro Restructuring

In 1973, the Government appointed Mr. William Hogg of Sault Ste. Marie, chairman of a committee to report on and make recommendations for municipal hydro restructuring both for regions and restructured counties. In February, 1975, the Hogg Report, as amended, was tabled in the Legislature and adopted as guidelines for local study groups. At the same time, a provincial Steering Committee on Municipal Hydro Restructuring was set up to coordinate the local studies in accordance with the provincial guidelines, and to provide an organization for reviewing and implementing these local studies.

Studies have been initiated in Waterloo, Peel, Niagara, York, Sudbury and Oxford. Waterloo Region is the first study to be completed. The Waterloo restructuring legislation will be introduced by the Treasurer during the 1977 Spring Session of the Legislature. The other utility restructuring studies are in various stages of completion.

During the year, new studies commenced in Hamilton-Wentworth, Halton and Durham Regions.

(vii) Power Costing and Rate-Making

In October, 1976, an Ontario Hydro study group completed a two-year study on the costing and pricing of electricity. On October 29, the Ministry of Energy tabled the report in the Legislature and requested Ontario Hydro to make it available to interested parties.

On February 24, 1977, the Minister asked the Ontario Energy Board to review the principles of power costing and rate-making appropriate for use by Ontario Hydro, and to include as part of its review the Ontario Hydro study on costing and pricing. By March 30, when the Board held a pre-hearing conference to discuss scheduling and procedural matters, about thirty parties had indicated their interest in the hearing. The main hearing will begin on May 16, and the Ontario Energy Board expects to complete the hearing late this summer and report to the Minister of Energy and Ontario Hydro by the end of 1977. Earliest implementation of the Board's recommendation would be January 1, 1979.

Interventions

Interventions by the Ministry of Energy before the National Energy Board are an important part of Ontario's energy policy. In 1976 these included:

<u>Intervention</u>	<u>Purpose</u>
1. Oil Supply and Demand Hearing	- To be informed of position of oil industry and other governments on supply and use of fuels; to test positions taken by industry submitters; to be assured that supply and demand forecasts of NEB are as realistic as possible; to carry forward government position on supply and demand (conservation) on fuel.
2. Interprovincial Pipe Line Ltd. (Rates and Tolls Hearing)	To ensure that rates charged for crude oil delivered to Ontario are as low as possible (at least fair and reasonable). To carry forward government position on security and costs and crude oil used in Ontario.

Intervention

Purpose

- | | | |
|--|---|--|
| 3. Mackenzie Valley/Yukon Pipelines | - | To ensure that decisions made with regard to this line are based on full information; to examine effect on Ontario in terms of supply and cost; to present Ontario's position through cross-examination and direct evidence as applicable. |
| 4. TransCanada PipeLines Ltd. (Rates and Tolls Hearings) | - | To ensure that rates charged to Ontario gas deliveries are as low as possible, or at least fair and reasonable, and not discriminatory. |
| 5. TransCanada PipeLines Ltd. (Facilities) | - | To ensure that Ontario's interests are protected by adequate, but not surplus, facilities; to ensure that environmental aspects are treated satisfactorily in Ontario. |
| 6. Heavy Fuel Oil Export Hearing | - | To be certain that exports are surplus to Canadian needs and that exports would not be detrimental to the price or supply in Ontario. |
| 7. Manitoba Hydro Export Hearing | - | To support interprovincial interconnections. |
| 8. Quebec Hydro Export Hearing | - | To reduce U.S. dependence on Canadian power and energy to facilitate repatriation. |
| | - | To be certain export is surplus to Canadian needs. |

ENERGY CONSERVATION

On October 29, 1976, the Minister of Energy announced the Province's energy conservation policy. The program's goals associated with that policy are to develop energy conservation techniques and to increase public awareness of the need for and the means to achieve conservation. This includes determining and, where appropriate, developing cost effective technology and demonstrating its role so as to gain public acceptance on a commercial basis.

Ontario's Conservation Policy recognizes government both as a leader and a consumer in energy conservation matters. As a leader, the Government has the responsibility to demonstrate new techniques for energy conservation to the private sector through conservation in its own operations and those of its related agencies.

The policy outlined the government's commitment to energy conservation, increased its budget and re-structured the conservation program objectives including emphasis on: Renewable Energy, Space Conditioning, Community Planning, and Awareness/Advocacy.

ENERGY MANAGEMENT PROGRAM

In 1976/77, the Ministry of Energy administered \$1.985 million in EMP project funds. Contracts with 13 Government Ministries were signed for projects designed to determine practical ways to achieve a more efficient management of energy consumption in all sectors of the Province's economy.

Some of these ministry projects were:

Agriculture and Food continued its educational programs to improve energy conservation awareness in the farming community and undertook a number of research projects aimed at reducing the energy requirements for crop drying and tillage operations.

Colleges and Universities, following its reported energy savings of \$4.1 million in fiscal 1975/76, continued to assist post secondary educational establishments in the improvement of thermal performance in these institutions.

Consumer and Commercial Relations continued work with the Canadian Gas Association at the Canadian Gas Research Institute aimed at developing improved residential gas furnaces and water heaters.

Correctional Services, a new member of the EMP in 1976/77, developed a guidance manual for energy auditing, and for the operation and maintenance of heating, ventilating, air conditioning and lighting equipment. A two-day seminar to acquaint operating personnel with these principles was held in March, 1977.

Education, provided combustion monitoring equipment to many school boards to enable them to improve the efficiency of their use of fossil fuels. A pamphlet titled "Awareness of Energy" was distributed to every teacher in the province. The Ministry also conducted 26 seminars for operating and maintenance staff across the province, and recorded attendance of more than 1,600 personnel.

Government Services, continued its program of energy management in Government-owned and occupied space. The Ministry's regional offices carried out 40 projects. In addition, audits were conducted in three major buildings and annual savings of \$160,000 have been projected. A computer analysis of Queen's Park and the Ontario Science Centre has also projected a saving of \$140,000 in the first year after energy conservation measures were implemented.

Health, another new member to the Energy Management Program, concentrated its initial efforts on analyzing energy use in a number of provincial hospitals with a view to identifying areas for low-cost rapid return energy savings in operation of the heating, lighting and air conditioning systems of these buildings.

Housing, assisted Consumers' Gas in the demonstration of Solar-MEC, a solar-assisted gas heating and cooling package unit for residential applications. The Ministry also continued to establish energy conserving operating and maintenance procedures for Ontario Housing Corporation's 77,000 units, in addition to conducting case studies of methods of reducing energy consumption for space and water heating.

Industry and Tourism, continued its efforts to assist secondary industry in improving efficiency use. Its Energy Bus, a computerized vehicle which assesses energy consumption, had, at the end of March, 1977, after 18 months of operation, identified total potential energy savings of \$21.5 million or about 17 per cent of usage on visits to 384 firms.

Natural Resources, through the Ontario Centre for Remote Sensing played a key role in the development of airborne thermography techniques for the detection of heat loss from buildings in conjunction with the Canada Centre for Remote Sensing. A number of test flights have demonstrated the value of thermography in supplying information on heat loss to individual property owners.

Transportation and Communications, assisted the implementation of efficient energy techniques for trucking industry, examined fuel use and driving cycles for trucks and cars, and evaluated a number of fuel saving devices.

Energy, seconded a member of its staff to the Federal Government for a one-year term to help the Office of Energy Conservation establish energy buses in other provinces.

Renewable Energy, The Ministry of Energy also investigated and demonstrated the utilization of renewable energy sources. Although these sources do not represent a broad-based alternative to conventional energy supply for Ontario at the present time, it has potential in reducing the demand for conventional energy, especially the use of solar energy for the provision of part of space heating and hot water requirements.

The ministries of Housing and Government Services are investigating the integration of solar heating into new public residential, commercial and institutional buildings. These types of buildings can accommodate custom designed and built solar systems which are too expensive for small residential units. The Ministry of Housing plans also to complement these efforts with the demonstration of commercial packaged solar heating systems for small residential buildings.

The Ministry of Energy completed negotiations with the National Research Council for joint participation in a wind-diesel hybrid power system for test operation on Toronto Island prior to servicing for northern communities.

A feasibility study of energy production from wood wastes in the Town of Hearst, commissioned by the Ministry of Energy, the Ministry of the Environment, the Town of Hearst and Hearst Lumbermen's Association, was completed this past fall.

Based on the results of that report, a more detailed engineering design and economic study was commissioned and is expected to be completed in the Fall of 1977.

Two joint studies with the Ministry of the Environment were also completed which examined ways of reducing the energy requirements for sewage sludge treatment and disposal, and the feasibility of using paper recovered from municipal refuse in the manufacture of cellular fibre insulation.

In November, 1976, the Ministry of Energy hosted the first Canadian seminar on the production and use of methanol as an alternative fuel. The seminar, attended by more than 200, was sponsored by the Canadian Societies of Chemical Engineering and Mechanical Engineering, and brought together experts from the United States, Europe and Canada.

An Ontario Alternative Fuels Advisory Committee, comprising representatives from the private sector universities, and the Provincial Government, is expected to be established in the coming fiscal year.

A number of reports were published in 1976/77, specifically: District Heating Study (Feb. 1976); Waste Oil Recycling Study (March 1976); Energy Analysis of Resource Recovery (April 1976); Solid Waste for Industrial Fuel (May 1976) and Hearst Wood Wastes Energy Study (December 1976). These reports are available from the Ontario Government Bookstore, 880 Bay Street, Toronto. In addition, a preliminary report on Methanol in Ontario was produced for the methanol seminar held in November 1976.

Energy Conservation Week, In addition to its coordinating role with other ministries, the Ministry of Energy developed its own conservation projects targeted to the individual citizen.

To increase public awareness of energy conservation, the first week of November was proclaimed Energy Conservation Week. Thousands of individuals of organizations participated actively in the Week's activities. The demand for conservation information was immediate and substantial.

Provincial-Municipal Conservation, The Ministry also developed a program to assist municipalities in implementing energy conservation, thereby setting a local example and helping to reduce costs for property owners.

This was accomplished through the Provincial-Municipal Liaison Committee, local property standards officers who were involved with the Ontario Home Renewal Program, and municipal engineers who by way of the Ministry of Housing/Municipal Engineers Committee requested the Ministry of Energy to assist in the development of energy conservation programs.

These liaison mechanisms are the basis of consumer-oriented energy conservation projects being planned for the coming fiscal year.

More than 200,000 copies of the Ministry's new publication titled "Energy Conservation - The Choice Is Yours" were distributed between November, 1976, and March, 1977, in addition to many thousands of related booklets.

Federal-Provincial Cooperation, The Energy Conservation Group participated in Federal-Provincial meetings and conferences on energy conservation, and represented the Province on Federal-Provincial task forces on renewable resources. Ministry staff also presented technical papers at several international conferences and fulfilled numerous speaking engagements throughout the Province.

REGULATORY AFFAIRS

This program involves essentially the regulation of the Ontario natural gas utilities and the administration of The Ontario Energy Board Act. About one-half of the Energy Board's resources are directed to regulation; the other half are directed to the support of the Ministry's Energy Policy Program.

Details of the Regulatory Affairs Program can be obtained by reference to the latest Annual Report of the Ontario Energy Board.

ENERGY SUPPLY

The overall objectives of the Energy Supply Program are to ensure that a continued supply of energy is available to users in Ontario to meet their requirements.

The Government of Ontario participates in energy supply management in three areas:

- Electrical supply through Ontario Hydro, including the program of electrification of remote northern communities described earlier in this Report.
- Crude oil supply through the Ontario Energy Corporation (O.E.C.) investment in the Syncrude Project.
- Natural gas supply through the O.E.C.'s investment in the Polar Gas Project.

Further information is provided in the latest Annual Reports of Ontario Hydro and the Ontario Energy Corporation.

PROJECT 12

During the past year the Ministry completed the first stage, or study stage, of a project which will permit quantification of Ontario's future energy demands. The study analyzes energy demand by fuel form and by end use in each of the three major sectors of the Provincial economy (industrial, transportation, residential/commercial).

The purpose of the models to be developed is to provide estimates of energy consumption which follow from various possible assumptions about the future. These assumptions could be as broad as population growth and economic development, as specific as insulation standards and vehicle weights. Emphasis has been placed on the detailed structure of energy demand and not upon the extrapolation of historic trends. The capability to evaluate alternate scenarios, including those associated with various policy alternatives is being built into the models.

By the end of the year the three study reports (one for each of the industrial, transportation, and residential/commercial sectors) had been completed. These reports set out in detail the present structure of energy demand and the forms of the models to be used to estimate future demand.

During 1977/78 emphasis will be placed on the computer implementation of these models. (Additional work, however, must be done on the commercial sector where there is a serious lack of data.)

It is also expected that the models will be useful to the Royal Commission on Electric Power Planning in the evaluation of its energy scenarios for the Province.

RESEARCH, DEVELOPMENT AND DEMONSTRATION

The first stage of technology associated with energy supply and utilization has been monitored with special attention being paid to the technology presently used or of potential application in Canada. Primary objectives of this monitoring have been to determine means of: (1) increasing energy supplies, either through improved efficiency of production or from new sources of energy, and (2) decreasing energy demand through improved efficiency of utilization. Other important objectives have been to ascertain technology helpful in reducing environmental impact from energy production and utilization and maintaining the cost of energy at a reasonable level.

The Ministry has developed studies and programs and has become associated with projects, all of which show promise of contributing to the above objectives. Included among these are:

Oil.....Syncrude

Natural Gas.....Polar Gas

Renewable Sources.....Solar Residential

- Provident House
- Aylmer Senior Citizens Project
- Solar Assisted Gas Heating Unit

Methanol

- Preliminary Report
- Seminar

Wind Turbine/Diesel Power
System Test

Wood Wastes

- Hearst Preliminary Study
- Hearst Engineering Design

Conservation.....Elliott Lake District Heating
Cost Study

Burner Efficiency Improvement Study

Thermography Pilot Project

Reduction of Energy Requirements in
Sewage Treatment

Fiscal Measures Review

In addition, in-depth monitoring of developments associated with advanced fuel cycles in nuclear fission and laser technology in nuclear fusion has been maintained.

A goal of the Ministry is to encourage wherever feasible the advancement of any energy technology that may in the foreseeable future be of assistance to the energy situation in Ontario. This encouragement does not necessarily have to be in the form of direct support by Ontario. To see that the full breadth of the energy spectrum (conservation included) is being considered, the Ministry has become familiar with the Federal Research, Development and Demonstration Program. Efforts have been made to support worthy projects that are not included in the Federal program, to sponsor jointly with the Federal Government projects in which Ontario should have a direct concern, and to stimulate thinking on projects appropriate for the future. The ultimate aim is to be certain that all future technological possibilities of importance to energy in Ontario are somewhere being advanced.

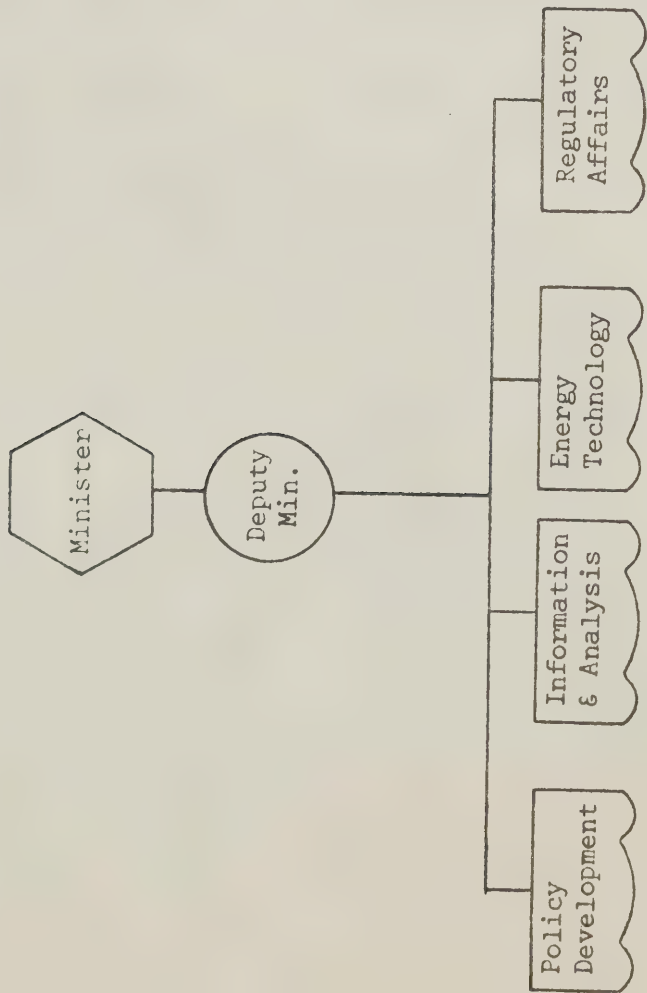
These research, development and demonstration areas on which the Ontario Government will place emphasis for direct support are renewable sources, conservation technology, and system studies - which significantly involve technical, economic and social ramifications - such as district heating, urban transportation/urban design, and the production, distribution and utilization of methanol.

THE ESTIMATES, 1977-78

MINISTRY OF ENERGY

SUMMARY

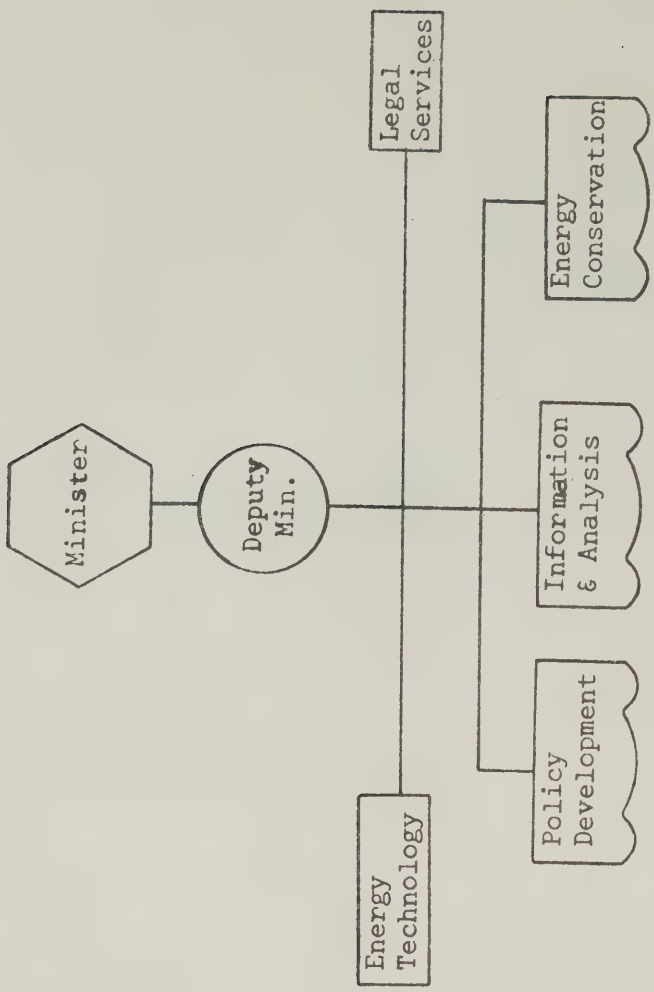
1977-78 Estimates	PROGRAMS	1976-77 Estimates	1975-76	
			Actual	Estimates
\$		\$	\$	\$
616,000	Ministry Administration	523,000	450,222	462,000
2,276,000	Energy Policy	2,068,000	1,435,284	1,490,000
636,000	Regulatory Affairs	596,000	534,610	577,000
5,365,000	Energy Supply	327,000	393,793	226,000
5,745,000	Energy Conservation	728,000	666,610	648,000
14,638,000	Ministry Total	4,242,000	3,480,510	3,403,000
18,000	Less Statutory Appropriations	18,000	21,525	23,000
14,620,000	TOTAL TO BE VOTED	4,224,000	3,458,994	3,380,000
ACCOUNTING CLASSIFICATION				
9,638,000	Total Budgetary Expenditures	4,241,000	3,480,519	3,402,000
5,000,000	Total Disbursements	1,000	-	1,000
14,638,000		4,242,000	3,480,519	3,403,000



MINISTRY OF ENERGY
BASIC ORGANIZATION
1973-76

MINISTRY PROGRAM STRUCTURE 1973-76

- Program #1- MINISTRY ADMINISTRATION
- Program #2- ENERGY POLICY
- Program #3- ONTARIO ENERGY BOARD
- Program #4- ONTARIO ENERGY CORPORATION

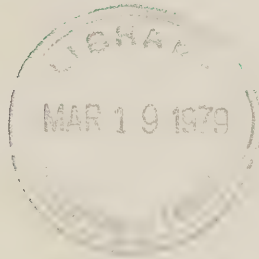


MINISTRY OF ENERGY
BASIC ORGANIZATION
1977-78

MINISTRY PROGRAM STRUCTURE 1977-78

- Program #1- MINISTRY ADMINISTRATION
- Program #2- ENERGY POLICY
- Program #3- REGULATORY AFFAIRS
- Program #4- ENERGY SUPPLY
- Program #5- ENERGY CONSERVATION

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**ANNUAL REPORT
OF THE
MINISTRY OF ENERGY**

YEAR ENDED MARCH 31, 1978

ANNUAL REPORT

Year Ended March 31, 1978



Office of the
Minister

Ministry of
Energy

416/965-4286

Queen's Park
Toronto Ontario

August, 1978.

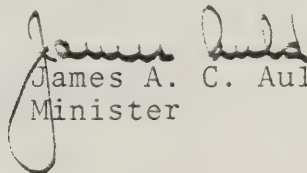
TO THE HONOURABLE PAULINE M. MCGIBBON
O.C., B.A., LL.D., D.U. (OTT)

Lieutenant-Governor of the Province of Ontario

MAY IT PLEASE YOUR HONOUR:

I take pleasure in submitting the Fifth Annual
Report of the Ministry of Energy for the fiscal
year ended March 31, 1978.

Respectfully submitted


James A. C. Auld
Minister



ice of the
puty Minister

Ministry of
Energy

Queen's Park
Toronto Ontario

August, 1978.

TO THE HONOURABLE JAMES A. C. AULD
Minister of Energy, Ontario

Sir:

I have the honour to present the Fifth Annual
Report of the Ministry of Energy for the fiscal
year ended March 31, 1978.

Respectfully submitted

Malcolm Rowan

Malcolm Rowan
Deputy Minister

MINISTRY OF ENERGY

ANNUAL REPORT

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DEPUTY MINISTER'S SUMMARY

The Ministry of Energy undertook important initiatives during 1977-78 in the fields of energy supply, pricing and conservation, at the same time as developing strategies geared to Ontario's long-term energy future. Increased emphasis on conservation and renewable energy were key features of the year's activities.

The framework for these initiatives was established in April, 1977 when the Ministry published Ontario's Energy Future, a 60-page booklet designed to make both public and policy-makers aware of the energy situation which faces Ontario.

In brief, the Energy Future Report says that both "long term" and "near term" as well as transitional energy strategies must be developed by the Province to maintain its strong economic health, with the long-term strategic emphasis being on renewable sources of energy, and the near-term emphasis on obtaining the maximum potential from conventional energy sources.

To help further these aims and to help establish a "national energy policy" rather than simply a "federally-imposed energy policy," Ontario played a key role in the formation of a Council of Canadian Energy Ministers during 1977-78. The Council held its first meeting in November, 1977. Ontario Energy Minister James Taylor was elected its first chairman.

The prime issue of immediate concern to the Council was the launching by the Federal Government of the Canadian Home Insulation Program on a rigid basis which clashed with the needs of most provinces and which held policy implications that clearly intruded in matters of Provincial responsibility. The Council developed a consensus, taking into account the energy needs of all regions of the country, and presented its concerns to the Federal Energy Minister in December, 1977. As a result, the Council succeeded in having some improvements made to the federal program. Mr. Taylor, at the time, expressed the hope that this kind of "meaningful consultation" might lead to a more comprehensive and cohesive national energy policy in Canada if it were followed by the Federal Government before launching any new programs, or before making important revisions to existing programs.

To complement the Provincial Energy Ministers' Council and to work out administrative details of various provincial policies to form a national perspective, the Inter-Provincial Advisory Council on Energy (IPACE), composed of Provincial Energy Deputy Ministers across Canada, met frequently during 1977-78.

In May, 1977 Ontario announced it would participate with the nine other provinces in a \$300,000 study to determine whether a coast-to-coast electric power transmission network is feasible in Canada. Ontario agreed to finance one-third of the cost of the study.

An important part of Ontario's "near-term" energy strategy, as set out in its Energy Future Report, is conservation. The Government, in its leadership role, initiated energy conservation in its own operations during the year (see Conservation Section of this Report).

The Ministry intervened on behalf of Ontario consumers at hearings of the National Energy Board and before the Alberta Energy Resources Conservation Board relating to matters affecting oil and natural gas supply.

An imaginative program designed to make optimum use of the warm water by-product of Ontario Hydro's nuclear generating stations was launched in 1977.

A consulting firm, Conestoga-Rovers & Associates, found in its December, 1977 Report to the Ministry that it was economically feasible to pipe the warm water from the Bruce nuclear plant to adjoining properties where the warm water (35° to 40°C) could be used for heating greenhouses and in the operation of fish farming and related aquaculture industries. This project, and the concept which it embodies, has symbolic importance in acquainting Ontario residents with the conservation ethic. In addition, there is the potential to attract new industries because of the "inflation-free" energy derived from the by-product heat of nuclear-electric power stations.

A major seminar on district heating as a conservation measure is planned by the Ministry for later in the year to further disseminate this message to town planners, architects and designers. The Ministry has also launched a number of studies into the potential for district heating. The days when Ontario residents can afford to be wasteful of abundant energy resources within Canada has clearly passed, and the Ministry feels it is important to acquaint both homeowners and industries with the realities of our energy future and with new energy techniques.

Energy pricing continued to be a major concern. The Province continued to oppose vigorously price increases for crude oil and natural gas on the arbitrary basis proposed by the Federal Government and the producing provinces.

A proposal for a blended price system, based on differences in cost of production of newly-found versus existing crude oil, was not accepted and the Federal Government increased the price of crude oil in two steps -- on July 1, 1977, and January 1, 1978 -- for a net increase of \$2.00 per barrel during the 1977-78 fiscal year. Further, \$1.00 per barrel increases are scheduled for July 1, 1978, and January 1, 1979.

Large increases in funding for energy conservation and renewable energy were made in 1977/78 and further expansion will take place in 1978/79. This additional funding and an increase in the number of energy management projects had led to creation of an Energy Conservation Group in the Ministry Office in 1976/77. In November, 1977 in recognition of the expanded role of renewable energy within the Ministry, the name was changed to Energy Conservation and Renewable Energy Group and a Senior Advisor, Renewable Energy, was appointed.

The statutory review process of Ontario Hydro's bulk power rate increase proposal resulted in an Ontario Energy Board recommendation for a cost-based increase of 9.4 per cent (for municipal utilities) and 10.3 per cent (for direct industrial customers), effective January 1, 1978, within the Anti-Inflation Board guidelines, as opposed to the 11.3 per cent and 12 per cent Hydro originally requested. Because of increased surplus electric power exports to the United States in 1977, this rate increase was offset so that the effective bulk power rate increase for 1978 is likely to be only about 2 to 3 per cent.

During the past year, the Ontario Energy Board's public hearings into the principles of costing and pricing of electricity continued. These were initiated by reference of the Ministry a year earlier, and are expected to last into 1979.

A Select Committee on Ontario Hydro Affairs began hearings in January, 1978 by considering Ontario Hydro's proposed long-term uranium purchases from Ontario sources through Denison Mines Ltd., and Preston Mines Ltd. Following a thorough examination, the Government issued an Order-in-Council on February 28, 1978, approving the purchase.

Through the Ontario Energy Corporation, the Province expanded its commitment to energy supply by means of its investments in the Syncrude and the Polar Gas projects during the year. The Ministry was pleased that the Polar Gas project filed an application to construct a pipeline to the National Energy Board in the fall of 1977. This is a further and important stage in this long-term development process.

Through Ontario Hydro, as a supplement to Ontario's conventional electricity supply program, the Program of Electrification of Remote Northern Communities was continued.

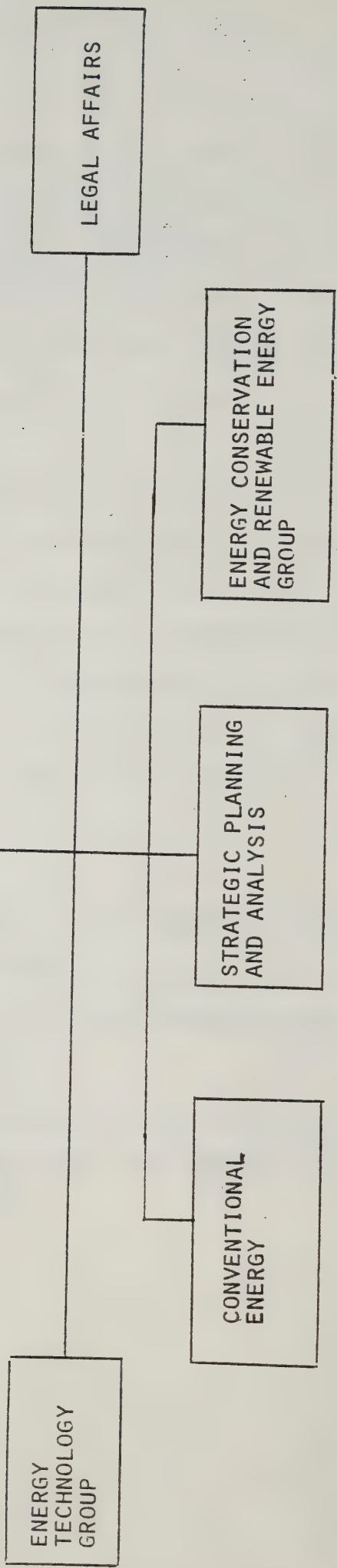
The Ministry's organization and program structure is shown on the chart included with the section on the Role of the Ministry.

In addition to the Ministry's Annual Report, separate Annual Reports are published by Ontario Hydro, the Ontario Energy Board and the Ontario Energy Corporation.*

- | | |
|--|---|
| * Ontario Hydro Annual Report | - Ontario Hydro, 700 University Ave.,
Toronto, Ontario
M5G 1X5 |
| Ontario Energy Board Annual Report | - Ontario Energy Board, 9th Floor,
14 Carlton Street,
Toronto, Ontario
M5B 1K5 |
| Ontario Energy Corporation Annual Report | - Ontario Energy Corporation,
4th Floor, 56 Wellesley St. W.,
Toronto, Ontario
M7A 2B7 |

MINISTRY OFFICE ORGANIZATION

TOTAL CLASSIFIED STAFF
AS OF MARCH 31, 1978: 43



ROLE OF THE MINISTRY

Prior to the 1973 oil embargo, the Ontario Government recognized that significant changes with respect to energy should be anticipated. A June, 1973 report to the Premier emphasized the need for Ontario to moderate its energy demands through efficiency and conservation as well as to assure that adequate supplies of energy would be available to the province. Legislation establishing the Ministry of Energy to discharge these responsibilities was formally proclaimed on July 3, 1973.

The over-riding fact in the energy situation in Ontario is our reliance on sources beyond our provincial boundaries for about 80 per cent of our energy requirements. In this context, the Ministry of Energy is responsible for the development and implementation of a provincial energy policy, designed to ensure that Ontario consumers receive an adequate and secure supply of energy at reasonable prices with an acceptable environmental impact.

To discharge this role the Ministry consists of a Ministry Office and three Government Agencies: the Ontario Energy Board, the Ontario Hydro Corporation, and the Ontario Energy Corporation.

The role of the Ministry Office is to provide support to the Minister in developing and effecting energy policy. This role involves the following functions or missions:

1. to review energy matters,
2. to advise on energy policy,
3. to apply energy policy through the co-ordination of the Government's energy-related activities and through interventions before provincial and federal tribunals,
4. to interpret Government policy to the Ministry's Agencies, to co-ordinate these Agencies in terms of Government energy policy and to serve as a link between the Ministry's Agencies and other Ministries.

In carrying out its responsibilities, the Ministry Office works in close co-operation with Ontario Hydro, the Ontario Energy Board and the Ontario Energy Corporation, and with officials of other Ministries of the Ontario Government. A considerable proportion of its task involves liaison with other governments, answering inquiries from the public, and maintenance of continuing rapport with special interest groups. The Ministry Office operates with a relatively small staff.

As a predominant factor in shaping contemporary society, energy exerts an influence in the formulation of tax laws, transportation policy and community planning, as well as affecting decisions in the industrial and commercial sector. To a large extent, it also influences the lifestyle of the individual.

Because of the influence on the individual and society, the Ministry had published in April, 1977 Ontario's Energy Future, a 60-page booklet designed to make both public and policy-makers aware of the energy situation which faces Ontario.

In the booklet's forward, the Minister of Energy stated: "I am not convinced that the public is sufficiently aware of the potential seriousness of our energy supply prospects ... That is the reason for this report -- to advise the public as to our energy future."

Ontario is dependent on other jurisdictions for about 80 per cent of its current energy supplies. As the Ministry's report points out, appropriate strategies must begin to be put in place now to assure delivery of energy from these or other sources in the longer term, and that a failure to act would be at our peril.

To quote from Ontario's Energy Future:

"In the long term there is no real doubt that Ontario -- in common with most of the countries of the world -- will have to rely upon energy from such renewable sources as the sun or such other sources as fusion and advanced fuel cycle fission that, although not strictly renewable, will be capable of supplying energy for such a long period of time that they cannot be classified with the non-renewable sources of energy that we use today.

The conventional sources of primary energy are crude oil, natural gas, coal, uranium, and hydraulic energy -- electricity generated through the use of falling water. For all practical purposes these sources now provide all of the energy that we use. Of the five sources only hydraulic energy is renewable.

Almost two-thirds of the electrical energy used in Ontario is produced in thermal plants that are fuelled with fossil fuels or uranium; in other words, most of our electrical energy is produced in thermal plants fuelled with non-renewable energy.

Apart from deposits of uranium and minor occurrences of natural gas and coal, Ontario has no indigenous non-renewable energy. Most of our crude oil and natural gas is moved by pipeline from Alberta and most of our coal, predominantly used for the generation of electricity and in the manufacture of steel, is supplied from sources in the eastern United States. A limited amount of coal is now being supplied from western Canada, an amount that, in spite of its very high cost relative to coal from the United States, will likely gradually increase.

The proportions of the various forms of primary energy used in Ontario in 1976 were as follows, with 1977 preliminary figures shown for comparison:

	<u>Final</u> <u>1976</u>	<u>Preliminary*</u> <u>1977</u>
Oil	39.6%	40.2%
Natural Gas	24.5%	23.4%
Coal	14.2%	15.3%
Electricity (hydraulic) ...	13.1%	12.0%
Uranium	5.6%	8.2%
Electricity (purchased) ...	3.0%	0.9%

The security of supply of each of these sources over the next twenty-five years and more is very important to the province."

The booklet points out, however, that:

"Projections of future supply, judged on the experience of the past, are uncertain and imprecise. Of necessity, they are based upon present knowledge that is incomplete and assumptions as to the future that contain a large component of judgement and even of speculation."

* For comparison purposes Preliminary 1977 figures are included although these are not set out in the Energy Future Report.

In conclusion, it states:

"Policy planning in Ontario should be structured on the basis of an energy future that is perceived as "near term" and "long term", the former being overlapped with a planned "transition phase."

The policy objectives of the "near term" and the "long term" are the same. Both are directed to providing the consumers of Ontario with secure and adequate supplies of energy at the lowest feasible cost. It is evident, however, that the sources of energy in the two periods will be different and, apart from a continuing commitment to energy conservation and the most efficient possible use of energy, the policies with which the two time frames must be confronted are very different.

It has been emphasized in this report that the "near term", which may extend fifty years into the future, is that period in which we will continue to rely upon depleting sources of non-renewable energy.

But before we reach the end of this defined "near term", it is critically important that a transition should have been made to the "long term" -- the period beyond 2025 when we will have to be capable of supplying the energy we need from renewable sources with a greatly reduced dependence on the energy sources we use today.

There is a serious danger that the policy needs of the "near term" could be so demanding that the approaching requirements of the "long term" would be neglected. The consequences of such neglect could be catastrophic. The disappearance of our resources of crude oil and natural gas can now be predicted with a reasonable degree of reliability and that within three or four decades they will be insufficient to provide the energy we need."

It continues:

"This fatal scenario is possible. If it is to be avoided, there has to be urgent and relevant energy planning in the world, in Canada and in Ontario. That planning must be directed to satisfying the energy requirements of the near term and, concurrently, creating the capability to effect a smooth transition to the (renewable) energy forms that will power the long term.

As has been emphasized throughout this report, the energy sources upon which Ontario depends are not renewable and they will be depleted. They will not, however, all become unavailable at the same time. Projecting supply trends can be hazardous, as noted, but conclusions with respect to our energy prospects must be reached."

The detailed conclusions of Ontario's Energy Future are included as Appendix A to this Annual Report; suffice it to say, their thrust is towards an ever-increasing role for Ontario in promoting energy conservation and developing renewable energy as well as investments and co-operative planning in the near-term to use and develop conventional energy sources in Canada to their maximum potential.

It is with this framework in mind that the Ministry's programs have been designed.

PROGRAM STRUCTURE

The Ministry of Energy functions within the framework of five specific programs:

- Conventional Energy
- Renewable Energy
- Energy Conservation
- Energy Regulatory Affairs
- Energy Supply

CONVENTIONAL ENERGY PROGRAM

This program is responsible for conventional energy policy development in the following areas:

- crude oil;
- natural gas, thermal and metallurgical coal;
- lignite;
- uranium;
- petro-chemicals and petroleum products;
- electricity.

The following considerations are implicit in the objectives of this program:

- to review energy matters on a continuing basis, particularly as they relate to supply, demand and transport of conventional energy resources;
- to ensure adequacy and security of conventional energy supplies at fair and reasonable prices and with acceptable environmental impact;
- to advise the Government on matters of conventional energy and related policy;
- to represent the Government's policy position and protect its interests before federal and provincial regulatory authorities;
- to co-ordinate the conventional energy-related activities of the Government, including policy direction to Ontario Hydro and technical support to the Ontario Energy Board.

During the past year, the Ministry has taken the following conventional energy policy initiatives:

A. Electricity

(i) Project Approval

As part of the Minister's responsibilities for Ontario Hydro, he makes recommendations to Cabinet concerning Ontario Hydro's expansion plans, which require final approval of the Lieutenant Governor in Council. During the past year, this procedure has involved the following projects:

- construction of the 3400 MW
Darlington Generating Station;
- construction of the 800 MW
coal-fired Atikokan Generating
Station (Phase I), involving 400 MW.
Ontario Hydro will proceed with
Phase I, 400 MW in 1978, although
Cabinet has approved an eventual
800 MW plant.

(ii) Rates and Charges of Ontario Hydro

On April 26, 1977, the Chairman of Ontario Hydro submitted a proposal to the Minister to change bulk power rates for municipal hydro utilities and direct industrial customers for the year 1978. The proposal was referred to the Ontario Energy Board (OEB) for review in accordance with Section 37A of the Ontario Energy Board Act.

In its proposal, Ontario Hydro sought to raise bulk power rates to all customers an average of 11.4 per cent and to increase rates for direct industrial customers an average of 12.4 per cent.

In his letter of June 8, 1977 to the OEB, the Minister of Energy expressed concern about another rate increase. He directed the Board to examine the proposal with the objective of finding a way to avoid a 1978 rate increase. The Minister also specified in this letter criteria to be used for the financial soundness of Ontario Hydro and also that bulk power rates for 1978 were to comply strictly with the spirit and intent of the Anti-Inflation Program. He stated that the Board was expected to scrutinize in appropriate detail all of the items of forecasted operating costs and to recommend where cost increases could be avoided.

The OEB undertook public hearings between July 14 and August 5, 1977, and reported to the Minister of Energy on August 31, 1977. The opinion of the Board as stated in the report was that Hydro should be allowed an average 9.75 per cent increase in the bulk power rates but that they should also be required to rebate \$108 million of expected excess revenue in 1977 as a reduction to their rate increase. The excess revenue was the amount above that allowed under the net margin test laid down by the Anti-Inflation guidelines. The OEB estimated that this would reduce the expected rate by about 4 per cent.

On September 23, the Chairman of Ontario Hydro informed the Minister that the Hydro Board had accepted the Energy Board's recommendation and that the \$108 million excess revenue would be applied as a rebate and used to reduce the 9.75 per cent increase allowed. This application of the rebate is expected to result in an average increase of 5.5 per cent for 1978 in the bulk power rate to municipal utilities and the rate to direct industrial customers. A further reduction as a result of unanticipated higher sales of electricity to the United States during the winter resulted in 1977 excess revenues of \$122 million, as determined at the end of 1977, and allowed the effective increase to be reduced to 2 to 3 per cent.

(iii) Expropriation Approvals

During the year, the Minister of Energy approved the expropriation of land for the following Ontario Hydro projects:

- OH-57 - Bruce-Milton Transmission Line,
Limehouse to Milton Section:
November 18, 1977;
- OH-62 - Bruce-Milton, Colbeck to Limehouse
Section: June 29, 1977;
- OH-63 - Lennox-Oshawa Transmission Lines,
West Half: February 8, 1978;
- OH-64 - Lennox-Oshawa Transmission Line,
East Half: February 22, 1978;
- OH-65 - Kleinburg-Claireville Transmission Line:
January 9, 1978.

(iv) Select Committee on Ontario Hydro Affairs

In November, 1977 a Select Committee of the Legislature was appointed to examine aspects of Ontario Hydro's operations. Three areas were identified initially:

1. An examination of the Lummus Company Canada Limited contracts with Ontario Hydro to build two heavy water plants at the Bruce Nuclear Power Development, and a related review of Hydro's heavy water commitment;

2. A review of Ontario's nuclear power commitment.
3. A review of the implementation of the recommendations of the Select Committee which examined Ontario Hydro's proposals for bulk power rates in 1976.

In December, 1977 as an additional responsibility, Premier William Davis asked the Select Committee to examine in detail Ontario Hydro's proposed long-term uranium contracts with Denison Mines Ltd., and Preston Mines Ltd.

Because of the necessity that the Denison contract be signed or rejected by February 28, 1978, it was agreed that this examination should comprise the first phase of the Committee's inquiry. Subsequent to the findings of the Select Committee, the Executive Council issued an Order-in-Council on February 28, 1978, authorizing Ontario Hydro to purchase the quantities of uranium as set out in the contracts with Denison Mines and Preston Mines.

The other three issues are to be considered in subsequent phases of the Committee hearings which will begin later this year.

(v) Northern Electrification

Electric power is made available to certain communities in northern Ontario, not currently served by the Ontario Hydro transmission system, under the following three programs:

1. Program for the Electrification of
Remote Northern Communities

The Government Program for the Electrification of Remote Northern Communities was announced on December 15, 1976. Under this \$3 million, three-year program, the Province is providing Ontario Hydro with capital funds for local diesel generation or extensions to existing transmission lines. Nine northern communities are presently involved in the program. Facilities to Hillsport, Oba and Armstrong are now on line, the other six communities are expected to receive service by 1980.

2. DINA/Ontario Hydro Indian Community
Electrification in Program

Under the terms of its agreement with the Federal Department of Indian and Northern Affairs, Ontario Hydro is already installing and operating central diesel generating systems in remote Indian communities. Ten communities are presently receiving power, and two more Indian communities will begin receiving power during 1978.

3. MTC/Ontario Hydro Telecom Power Program

During 1973, the Ministry of Transportation and Communications (MTC) reached an agreement with Bell Canada to have telecommunications and telephone facilities installed in remote Indian communities. Ontario Hydro is the power supply contractor for such facilities using generators purchased by MTC. MTC committed about \$400,000 for these purchases during 1976 and the first six power systems were installed by Ontario Hydro. An additional ten systems were installed in 1977, completing this program. It should be noted that these generating facilities are devoted solely to the Bell Canada installations.

(vi) Municipal Hydro Restructuring

The major restructuring of local government in the early 1970's and the establishment of many new municipal boundaries created the need to examine the restructuring of the jurisdictions of retail electrical distribution authorities.

In 1973, the Government appointed Mr. William Hogg of Sault Ste. Marie, Chairman of a Committee to report on and make recommendations for municipal hydro restructuring both for regions and restructured counties. In February, 1975 the Hogg Report, as amended, was tabled in the Legislature and adopted as a guideline for local study groups. At the same time, a provincial Steering Committee on Municipal Hydro Restructuring was set up to co-ordinate the local studies in accordance with the provincial guidelines, and to provide an organization for reviewing and implementing these local studies.

Since that time, restructuring studies have been initiated in nine regions and counties. Legislation has been enacted for the Regional Municipalities of Waterloo and Peel in July, 1977 and for the County of Oxford in December, 1977.

Legislation to restructure the electrical utilities in the Regional Municipality of York is expected to be introduced into the Legislature during its 1978 Spring session. Other restructuring studies are now in various stages of completion.

(vii) Electrical Bulk Metering

In June, 1976 the Select Committee of the Legislature investigating Ontario Hydro recommended that all new multi-unit residential buildings be individually metered and that existing bulk metered units be retrofitted.

In response to this recommendation, the former Energy Minister, the Honourable Dennis R. Timbrell, accepted an undertaking by Ontario Hydro, the Ontario Municipal Electric Association, and the Association of Municipal Electrical Utilities, to establish a Tri-Party Committee to investigate the energy and dollar benefits and costs of banning bulk metering in Ontario for new construction.

Following more than a year of study, the final report of the Tri-Party Committee on Electrical Metering was tabled in the Legislature on December 15, 1977. The Committee recommended that all future apartment buildings and multi-unit houses built in Ontario should install individual electrical meters for each suite.

Copies of the report have been sent to a number of groups and individuals for comment. Based upon an analysis of the Committee's recommendations as well as the reaction of the public and various interested groups, it is expected that policy recommendations will be brought forward to Cabinet later in 1978.

(viii) Power Costing and Rate-Making

In October, 1976 an Ontario Hydro study group completed a two-year study of electricity costing and pricing. On October 29, 1976, the Minister of Energy tabled the report in the Legislature and requested Ontario Hydro to make it available to interested parties.

On February 24, 1977, the Minister asked the Ontario Energy Board to review the principles of power costing and rate-making appropriate for use by Ontario Hydro, and to include as part of its review a detailed examination of the Ontario Hydro study report. By March 30, 1977, when the Board held a pre-hearing conference to discuss scheduling and procedural matters, about thirty parties had indicated their interest in the hearing.

The main hearing began on May 16, 1977. Phase III of the Study Hearings dealing with methods used to determine marginal cost and demand elasticity which began on January 10, 1978, is currently in progress. The fourth phase of the hearings is due to begin in October and the final report is expected in 1979.

On March 13, 1978, an Interim Report on the Depreciation Policy and Procedures for Major Fixed Assets in Ontario Hydro was submitted by the Ontario Energy Board to the Minister of Energy. This was pursuant to a desire expressed by Ontario Hydro to have the subject of depreciation dealt with so that it might incorporate any changes into its 1979 rate proposals. The Energy Board recommended the:

1. implementation of straight line remaining life procedures after AIB guidelines are withdrawn;
2. distribution of Unallocated Depreciation Account to be examined at a bulk power rate hearing;
3. examination of service costs by a bulk power rate hearing before significant amounts are added to the depreciation base;

4. examination of a bulk power rate hearing of changes to asset service lives of a fossil-electric or nuclear-electric generation or heavy water production plant having impact on revenue requirement, prior to the implementation of any changes.

The Ontario Energy Board may make further recommendations on the subject of depreciation suitable for Ontario Hydro in its final report, following completion of its inquiry into electricity costing and pricing.

(ix) Revised Load Forecast

Ontario Hydro's 1977 forecast of demand for electricity was monitored against month-by-month actual peak and base load demands. Discussions were held with Hydro officials regarding long-term assumptions on matters such as population factors, real economic growth, industrial expansion, utilization levels of manufacturing production capability, personal disposable real income, immigration levels, etc., and how these could influence the demand for electricity.

Similarly, Ontario Hydro's 1978 load forecast (dated February 13, 1978) was examined in conjunction with officials of the Ministries of Industry and Tourism, and Treasury, Economics and Intergovernmental Affairs.

(x) System Expansion Program

As a result of the 1978 forecast of electrical demand over the years 1978 - 2007, a forecast surplus of 3,700 megawatts generation capacity was identified up to 1985. A review of alternative generating plant construction requirements (system expansion) was initiated, leading to the cancellation of 2 units of the oil-fired generating station under construction at Wesleyville. It also led to intensified efforts to sell for export projected interim electric power surpluses.

An associated review of heavy water supply/demand was initiated to determine whether there would be any surplus capacity in future years, and what action should be taken if there is a projected surplus.

(xi) System Expansion Interim Approval Process

In co-operation with officials of the Ministry of the Environment and of Ontario Hydro, an interim Government approval process for additional generating capacity and associated transmission facilities was agreed upon, pending the recommendations by the Royal Commission on Electric Power Planning. The RCEPP Report is due in October, 1979.

(xii) Inter-Provincial Advisory Council on
Energy (IPACE) Study for Inter-Provincial
System of Inter-connections

The Ministry of Energy participated in a three-man Inter-Provincial Management Committee set up in 1977 by IPACE to study the feasibility, cost-benefit, energy-economic, and institutional/jurisdictional aspects of an inter-provincial network of electrical power transmission interconnections. That study is still underway but is expected to be completed in the fall of 1978.

(xiii) Hydraulic Development

In consultation with officials of other Ministries, Ontario Hydro officials were encouraged to evaluate the remaining potential of additional hydraulic power generating capability in Ontario. This program is still being developed.

(xiv) Fusion

(1) Support was provided the University of Toronto Institute for Aerospace Studies for the completion and operation of an experimental facility for the study of plasma recombination. Information being collected is valuable in the design of gas targets that could be utilized for the production of high energy neutrons needed in studies of irradiation effects on materials.

(2) Assistance was provided McMaster University late in 1977-78 for upgrading the measurement and monitoring capability of equipment for plasma-wall interaction studies in Tokamak fusion devices. The program continues into 1978-79 with utilization of the equipment on the ALCATOR - "A" fusion facility at the Massachusetts Institute of Technology.

(xv) Irradiated Fuel Management

Discussions were undertaken during 1977 between representatives of the Ministry of Energy, Ontario Hydro, Atomic Energy of Canada Ltd., and the Federal Department of Energy, Mines and Resources, with respect to the management of irradiated fuel from Canada's nuclear plants. The objective was to reach agreement on the elements of a proposed management program and to establish a time-table for obtaining joint policy approval.

These discussions are designed to clarify the timing of the program and to set out a clear understanding as to respective roles and responsibilities.

A statement by the Ontario Minister of Energy, released on March 11, 1977, after a meeting with the Federal Minister of Energy, Mines and Resources, recognized the need for a clear definition of the roles and responsibilities of the Federal and Ontario Governments and their agencies in the development of technology and the demonstration of a method of permanent disposal of radioactive wastes arising from the operation of nuclear-electric generating stations.

It is expected a joint Canada/Ontario Irradiated Fuel Management agreement setting out these roles and responsibilities will be reached later in 1978.

Royal Commission on the Northern Environment

In addition to the above electrical initiatives, the Ministry also made a 27-page submission to the Royal Commission on the Northern Environment which identified energy issues and policy implications for Ontario, and particularly for northern Ontario.

B. Crude Oil

Crude oil price and supply continued to be major issues in 1977/78.

The Federal Government increased the price of crude oil by \$1.05 per barrel on July 1, 1976, \$0.70 on January 1, 1977, and another \$1.00 on each of July 1, 1977, and January 1, 1978. It proposes to make further \$1.00 per barrel increases on July 1, 1978, and January 1, 1979.

The Ministry's position on crude oil prices has remained unchanged; it is opposed to increases unrelated to the cost of production and which cannot be shown to ensure future energy supplies for consumers.

Ontario does not reject higher prices simply for the sake of keeping prices down. Ontario rejects the concept of automatically increasing prices without regard for the effect on future supply, on Canadian consumers and, ultimately, on the Canadian economy. Ontario accepts the premise that energy costs will rise -- but they need not rise to the extent that they have for oil (and natural gas) already in production at much lower costs. New and more costly supplies should be appropriately priced at a higher level, so as to bear a credible relationship to the higher cost of developing them.

Moreover, Ontario believes that any price increase should meet the following objectives:

- it should develop additional supplies of crude oil, natural gas, and, if need be, other sources of energy;
- it should protect the competitive position of Canada's industries;
- it should encourage the creation of new jobs;
- it should alleviate inflation; and
- it should be equitable.

It was with these objectives in mind that, in 1976, Ontario proposed to the Federal and other Provincial Governments, a blended price system. Ontario vigorously advocated its adoption at the Federal/Provincial Energy Ministers' Conference that year and subsequently. The Ministry continues to pursue this policy as a logical method for cushioning the impact of higher cost crude oils obtained from the more costly domestic sources and from foreign supplies.

At the May, 1977 Conference of Federal and Provincial Energy Ministers in Ottawa, the Ontario position was clearly stated:

"It is not the time to increase inflationary pressures in Canada, it is not the time to further decrease job creation and it is not in the interest of Ontario or Canada to reduce the competitive capability of our export industry."

Ontario, further expressed the view that there was insufficient information available to assure other Governments, or the public, that the monies already being extracted from consumers -- on the pretense of extending energy supply -- was effectively serving this purpose.

Refined Petroleum Products and Petrochemicals

A combination of factors including increased crude oil prices, lower economic growth and the impact of conservation measures have served to reduce substantially the demand for petroleum products in the Province of Ontario.

Reduced demand coupled with an excess in refining capacity has precipitated a highly competitive market environment for petroleum products in most locations throughout the province.

Although Ontario consumers during the year were paying higher prices for motor gasoline and home heating fuels, prices in Ontario were, in general, either equal to or lower than prices in most other parts of the country. An aggressive and highly competitive Ontario market is likely to continue for some time. The Ministry continues to monitor these prices closely.

C. Natural Gas

The Ministry of Energy, in keeping with its policy of assuring long-term supplies of natural gas at the lowest cost for the Ontario consumers, continues to intervene at, and monitor the hearings before the National Energy Board and the Alberta Energy Resources Conservation Board. During fiscal 1977-78, the Ministry participated at six hearings before the National Energy Board and one hearing before the Alberta Energy Resources Conservation Board. In addition, through the Ontario Energy Corporation, the Ministry continued its participation in the Polar Gas Project. This project is dealt with in further detail in the Annual Report of the Ontario Energy Corporation and in the Report under the energy supply program.

In June, 1977 the National Energy Board refused an application from Canadian Arctic Gas Pipelines Limited (CAGPL) to build a pipeline along the MacKenzie Valley route, to carry Alaskan and Canadian natural gas to southern markets in Canada and the United States. Instead, it recommended the issuance of certificates to Foothills Pipelines (Yukon) Limited for an alternate Alaska Highway route.

This action concluded the Northern Pipelines Hearing of the National Energy Board and brought to an end the two years of interventions and attendance by the Ministry. The NEB's reasons for decision bear evidence of the issues pursued by the Ministry of Energy on behalf of the Ontario consumers during the conduct of the hearing.

The Ministry of Energy also followed closely the legislation leading up to the passage of the Northern Pipelines Act by the House of Commons. The Minister appeared before the Special Committee of Parliament on March 14, 1978, and made a strong case for inclusion of Ontario on the Federal-Provincial Consultative Council, to be authorized by the Act to advise on all matters pertaining to the Northern Pipeline and matters of Canadian content and participation.

ENERGY CONSERVATION PROGRAM

This program is responsible for the development of policies and program coordination of the Ontario Government's Energy Conservation Program. A complete list of projects in 1977-78 under this program is included as Schedule B to this report.

During 1977/78, the Government's commitment to the conservation and efficient use of energy now and the exploration and development of non-conventional energy sources for the future was backed by substantially increased funding. While continuing in its main role of policy development and coordination of projects operated by other Government Ministries, the Ministry of Energy saw its budget in this area increase almost three-fold to \$5.7 million. Much of this was re-allocated to 13 other Ministries to enable them to conduct specific energy projects.

In the April 1977 policy document, Ontario's Energy Future, the objective for the Government's energy conservation program was re-affirmed. The goal was set at a one-third reduction in the rate of growth of energy consumption in Ontario by 1980. If this could be achieved, it would mean a \$1 billion saving in the Province's energy bill.

As both a leader and a consumer in conservation matters, Government through the Ministry sought to demonstrate how the conservation ethic, which has gained philosophic acceptance in Ontario, might be translated into action.

Working toward these objectives, the Ministry pursued energy conservation on four fronts: measures designed for consumers and homeowners, innovations in transportation and urban development, improvements in energy use in public buildings and selected commercial enterprises, and public awareness.

(i) Conservation for Consumers and Homeowners

A unique project to determine the most effective means of encouraging homeowners to conserve energy was conducted in three communities. Lindsay was the site in May of the first thermography information clinic in Canada where residents could view photographs of their houses showing heat loss detected by infra-red scanners.

In January, Brockville residents were able to obtain individual advice on reducing heating bills. The computer-analyzed results showed the average homeowner could reduce an annual heating bill of \$477 by \$160.

The Lindsay experiment was repeated in Stratford in March and a questionnaire survey is planned for Lindsay for later this year. In each case, the projects were conducted by the Ministry in co-operation with local officials.

(ii) Conservation for Transportation and Urban Development

As part of the Ministry's overall program, the Ministry of Transportation and Communications undertook projects aimed at better use of gasoline by identifying factors determining engine efficiencies and the practicality of car pooling for MTC employees at their Downsview location. Another demonstration project examined the potential of low-power luminaries for street lighting.

Similarly, the Ministry of Housing tackled problems of energy conservation in planning and design of new residential and commercial developments. Following earlier work on the district heating concept, the Ministry of Energy commissioned feasibility studies for redevelopment areas of Sarnia and the City of Toronto and sponsored a technology mission to three Scandinavian countries to determine the transferability of the European experience. The Ministry of Energy also commissioned a study on institutional factors related to district heating.

(iii) Public Buildings and Commercial Enterprises

Funded by the Ministry of Energy, the Ministry of Government Services continued its program of building improvements at sites including the Queen Park's complex, the Ontario Science Centre, 135 St. Clair Avenue West and 2195 Yonge Street. In addition, funds were provided to initiate cost/benefit analysis programs and the establishment of thermal performance guidelines for government buildings.

Similar energy conservation projects were conducted by the Ministries of Health, and Colleges and Universities with institutions with which they are associated. The Ministry of Education continued to assist boards of education to assess their energy consumption, and continued work on material and guidelines for school programs.

The Ministry of Agriculture and Food directed specific attention to the problems facing greenhouse operators as a result of higher energy costs. Work was conducted on the feasibility of solar greenhouses, soil warming and the use of waste warm water from Ontario Hydro generating stations.

Ontario's Energy Bus, which brings computer equipment to the doorstep of industries to conduct energy audits, was adopted by the Federal Government for a national program. The Ontario bus, successfully operated for two years by the Ministry of Industry and Tourism, has allowed some 600 companies in the province to identify more than \$31 million in potential energy savings.

(iv) Public Awareness

Displays depicting insulation techniques, specific government projects, the concept of passive solar heating and energy conservation tips for the home were developed and toured locations in Brockville, Stratford, Toronto, Bowmanville, Sarnia and Windsor. A collection of slides to supplement the public information program of the Ministry was expanded.

A 44-page booklet on solar energy, Turn On The Sun, was prepared to meet the growing demand for straightforward answers about the cost and potential of solar energy for residential use in Ontario.

RENEWABLE ENERGY PROGRAM

This program is responsible for the development of policies and programs in support of renewable energy. A complete list of 1977-78 projects under this program is included as Appendix B to this report.

Looking ahead, the Energy Future Report set out the need for alternate energy sources in the future but pointed out that few commercial successes in the field have been achieved to date. It was forecast that despite a steady growth in the use of solar energy and increased use of forest and municipal waste, the combined effect of all efforts to harness renewable energy sources in the year 2000 would probably supply no more than two per cent of the province's energy demand.

"The long term impact of solar-based renewable energy resources will depend on the technical and economic breakthroughs that result from Government and private sector research, development and demonstration in the next two or three decades." With this in mind, the Ministry in conjunction with six other ministries launched or headed to completion more than two dozen renewable energy demonstration projects or studies.

Among the more than two dozen renewable energy projects, work proceeded on construction of a solar-heated 30-unit senior citizens' residence in Aylmer and a solar-heated courthouse in Newmarket. Work was also underway on solar water heating in an Etobicoke school and solar-assisted space heating in a school in St. Catharines. Design studies were in progress incorporating solar technology in a row housing project in southern Ontario, community swimming pools, the proposed Visitors' Centre at Black Creek Pioneer Village, a 150-unit student residence at Confederation College of Applied Arts and Technology in Thunder Bay, a number of Ontario Housing Corporation buildings and a hospital in Oakville.

In October, 1977 the Energy Minister officially launched a unique windmill demonstration project on Toronto Island. The 13-metre high windmill was constructed in combination with a diesel generator to determine the economic feasibility of similar installations for remote areas in the north not connected to Ontario Hydro's power grid.

An engineering study for a facility to generate electricity and steam from wood and municipal waste in the Hearst area neared completion. The study stemmed from initial research which indicated that such a project could be economically and technically feasible. The \$130,000 study was jointly funded by the Ministries of Environment; Natural Resources; Energy; Treasury, Economics and Intergovernmental Affairs; the Town of Hearst and the Hearst Lumbermen's Association.

(i) Advisory Group on Synthetic Liquid Fuels

As a follow-on of a symposium entitled "Alcohols as Alternative Fuels for Ontario," which was co-sponsored by the Ministry of Energy and held in November 1976, the Minister appointed in May, 1977 the "Advisory Group on Synthetic Liquid Fuels (including Methanol): Production and Utilization for Ontario."

Appointed to the Advisory Group were representatives of industry, the academic and consulting communities, and government. The terms of reference for the Advisory Group were to examine the viability of synthetic liquid fuels as an alternative to petroleum-derived fuels in Ontario, in particular to evaluate the resources, the processes, and all other aspects necessary for the possible use of such fuels, and to make whatever recommendations appear appropriate. Special attention was to be given to the indigenous biomass resources of Ontario.

Six Task Forces were established by the Advisory Group to examine in detail the resources available for the production of synthetic liquid fuels, their utilization in transportation, in space and process heat, and in electricity generation. Production technology was also reviewed and an economic analysis was carried out.

The report of the Advisory Group is expected to be available early in 1978-79.

ENERGY REGULATORY AFFAIRS PROGRAM

This program involves essentially the regulation of the Ontario natural gas utilities and the administration of The Ontario Energy Board Act. About one-half of the Energy Board's resources are directed to regulation; the other half are directed to the support of the Ministry's Conventional Energy Program.

Details of the Regulatory Affairs Program can be obtained by reference to the latest Annual Report of the Ontario Energy Board.

ENERGY SUPPLY PROGRAM

The overall objectives of the Energy Supply Program are to ensure that a continued supply of energy is available to users in Ontario to meet their requirements.

The Government of Ontario currently participates in energy supply management in four areas:

- Examining and promoting development of moderator cooling water of Ontario Hydro's nuclear generating stations for use in commercial heating applications, as discussed earlier in this Report.
- Electrical supply through Ontario Hydro, including the program of electrification of remote northern communities described earlier in this Report.
- Crude oil supply through the Ontario Energy Corporation (O.E.C.) investment in the Syncrude Project.
- Natural gas supply through the O.E.C.'s investment in the Polar Gas Project.

Further information is provided in the latest Annual Reports of Ontario Hydro and the Ontario Energy Corporation.

THE ESTIMATES, 1977-78
 MINISTRY OF ENERGY
 SUMMARY

1978-79 Estimates \$	PROGRAMS	1976-77	
		Actual \$	Estimates \$
885,000	Ministry Administration	516,244	523,000
2,321,000	Conventional Energy	1,282,078	1,571,000
2,455,000	Renewable Energy	119,901	145,000
5,350,000	Energy Conservation	503,599	583,000
1,239,000	Regulatory Affairs	966,522	1,093,000
15,119,000	Energy Supply	291,363	327,000
27,369,000	Ministry Total	3,679,707	4,242,000
18,000	Less Statutory Appropriations	18,000	18,000
27,351,000	TOTAL TO BE VOTED	3,661,707	4,224,000
ACCOUNTING CLASSIFICATION			
12,769,000	Total Budgetary Expenditures	3,679,707	4,241,000
14,600,000	Total Disbursements	-	1,000
27,369,000		3,679,707	4,242,000

APPENDIX A

ONTARIO'S ENERGY FUTURE

CONCLUSIONS

As has been emphasized throughout the report, the energy sources upon which Ontario depends are not renewable and they will be depleted. They will not, however, all become equally unavailable at the same time. Projecting supply trends can be hazardous, as noted, but conclusions with respect to our energy prospects must be reached. It is important to make these conclusions specific and public in order that others who have arrived at different conclusions can challenge them. To the extent that there is universal agreement as to the validity of assumed facts the design of policy is made less difficult.

Conclusion #1: Crude oil from domestic sources will be in seriously short supply by the mid-1980s, forcing Ontario to rely to a major extent on imported crude oil.

Conclusion #2: While the production of synthetic oil as a result of intensive development of Canada's oil sands or heavy oil deposits could lessen the dependence on imported oil, it is probable that the deficit in domestic supply will persist through the 1980s.

Conclusion #3: Reliance upon the expectation of the discovery of major new deposits of crude oil in Canada is too speculative to be incorporated into Ontario's "near term" planning.

Conclusion #4: Shortages of natural gas will develop in Ontario in the mid-to-late 1980s even if domestic consumption does not expand beyond current levels, unless there is early construction of transportation facilities for the movement of natural gas to Ontario markets from the Arctic.

Conclusion #5: Energy from coal will not be capable of compensating for a deficit in the supply of crude oil and natural gas in the 1980s and 1990s as a consequence of production, environmental, transportation cost and other constraints.

- Conclusion #6: An increasing proportion of the energy used in Ontario will be in the form of electricity.
- Conclusion #7: Uranium-fuelled electrical generation is of growing importance for Ontario and the effect of a withdrawal from the nuclear commitment would be serious in terms of the energy prospects of the province. Ontario now has no economical and practicable alternative to the use of coal and uranium as fuels for new generating capacity; a number of considerations will result in a primary emphasis on new uranium-fuelled electrical generating capacity.
- Conclusion #8: Every effort must be made to assure that nuclear facilities and the nuclear cycle continue to be as safe as other energy forms and are seen by the public to be as safe.
- Conclusion #9: Solar space heating and other prospective sources are not capable at the present state of technology of producing energy economically or of providing a significant proportion of the energy used in Ontario. Nor are they likely to be throughout most of the "near term."

Conclusion #10: Basing future energy policy on the expectation that a single technological breakthrough will resolve Ontario's energy problem is unwise and even dangerous.

Conclusion #11: Investments and incentives for conservation and efficiency in energy use must be afforded high priority by Government and the public: it will have important environmental implications; by narrowing the gap between domestic energy supply and demand and thereby reducing imports, it will have positive economic implications; investments in measures to increase efficiency and reduce energy demands are likely to be more productive over the long run than the supply investments that are displaced.

Conclusion #12: Conservation and efficiency of use, notwithstanding their importance, will not eliminate the need for increased energy supply.

Conclusion #13: The energy supply investments that will be required will make severe demands upon the capital available in Canada or available from abroad for use on projects in Canada.

The preceding conclusions with regard to the energy supply-demand outlook, and the importance of various energy forms, lead to a series of conclusions of a policy nature.

To begin with, it is irrational, in the "near term", to prejudice the economy of Ontario and of other parts of Canada by unnecessarily escalating the prices of crude oil, natural gas and coal. The price should relate to the actual cost of the discovery, development, transportation and conversion of these energy sources and should not be moved up in response to the appetites of governments in Canada for increased royalties or tax revenues: prices in Canada should not be related to world prices and ignore the actual cost of delivering energy in specific forms to Canadian consumers from Canadian sources.

Conclusion #14: The price of energy from sources in Canada, including natural and synthetic gas and crude and synthetic oil, as well as coal and uranium, should not be permitted to escalate in response to the monopoly selling power implicit in growing shortages, but should relate very directly to the cost of producing and delivering the energy in useable form.

- Conclusion #15: The price of energy should be a weighted average of the actual cost of producing energy at higher costs from new sources and lower costs from established reserves.
- Conclusion #16: Increases in the cost of energy impact most severely on those least able to pay. Further, unnecessary increases in price unnecessarily damage industrial economies in Canada. It is inequitable to consumers and irrational in terms of industrial development to escalate price in an attempt to reduce energy consumption.
- Conclusion #17: Planning in Ontario should be based upon the expectation that, because the cost of producing energy will continue to increase, the price of energy to the consumer will continue to increase.

Nor can costs be ignored in making selections between existing and alternative energy sources. The well-being of consumers and the competitive strength of the province could be undermined if Ontario (or Canada) permitted itself to become irreversibly and prematurely locked into energy production processes that subsequently proved to be less efficient and less economical than some alternative.

For example, the cost of extracting oil from the oil sands, using the present technology, is relatively high. The effect discussed in the previous paragraph would result if commitments to a number of plants using the existing technology were made and a subsequent technological development produced processes that would extract the oil from the sands at a very much lower cost.

It has been concluded that natural gas will be in short supply in the mid-to-late 1980s and there is no evident alternative to natural gas from the frontiers. Synthetic gas is theoretically available from various sources -- coal, biomass -- but at the current stage of technology these sources are not economic sources of gas in commercial quantities.

The risks of misjudging the future are high and, in an effort to reduce the penalties of misjudgement, policies and programs must be as flexible as possible in order that negative effects can be held to a minimum. But the greatest risk of all is a serious and continuing energy shortage, and irrespective of the clustering uncertainties, judgements must be made and decisions must be taken that will tend to reduce this over-riding danger.

- Conclusion #18: Construction of transportation facilities that will connect the gas resources of the Mackenzie Delta to the industrial markets of southern Canada should be undertaken at as early a date as possible, subject to appropriate social, economic and environmental safeguards.
- Conclusion #19: Facilities for the extraction of synthetic oil from the oil sands or from the heavy oils should be expanded at the rate that available capital permits, subject to the price to consumers of the resulting oils bearing an appropriate relationship to crude oil from other sources such as, for example, offshore.
- Conclusion #20: The most effective possible use must be made of the capabilities, facilities and institutions of the private sector that are now engaged in supplying energy to the consuming public. The Government of Ontario should not attempt to displace or compete with private sector organizations that are effectively performing the task of supplying energy and nor should government in general tax the private sector to such an extent that it is unable to undertake the high risk investment frequently associated with energy development.

- Conclusion #21: Government of Ontario investments in research, development and demonstration projects should be so planned as to complement those of other governments and private corporations; attention should be focussed on undertakings that may have important results but are not economic for private investment.
- Conclusion #22: A Canadian Council of Energy Ministers should be formed and funded by all governments in Canada. It should be supported by a Research Secretariat which has the potential of providing a national focus on questions related to the supply and demand of energy in Canada.
- Conclusion #23: Energy forms from Canadian sources will not deplete simultaneously. Their use should be planned by taking into account the expected supply life and the uses for which specific forms are particularly well suited.
- Conclusion #24: The acceleration of planning and the related investments and incentives that will advance the transition to renewable energy sources must be considered to be very urgent.

All forms of energy conversion require vigilance in assuring that minimum damage is done to the environment. The fact is there are adverse environmental consequences associated with the extraction, transportation, processing and use of all energy forms. The forms of the future may reduce environmental costs but it cannot be presumed that such costs will be eliminated. At all times the environmental costs or risks must be weighed against the costs of having insufficient energy supplies.

Conclusion #25: Environmental considerations must be accorded a high priority in efforts to resolve energy supply problems and with respect to energy use.

It bears repetition that the requirements related to energy planning in the "near term" are likely to be pressing and urgent and will make heavy demands upon all relevant resources: it equally bears repetition that the effects of failure to provide energy sources that are an alternative to the depleting non-renewable sources prior to their depletion whether that is destined to be at the end of the first or second quarter of the next century -- would be very serious in terms of the future of this province and of western civilization.

Conclusion #26: The Ontario Government commitment to research, development and demonstration related to renewable energy resources should be intensified and, over the next five years, the commitment of capital and research capability directed toward accomplishment in this area should be multiplied several times over.

A comprehensive energy policy must extend well beyond the design of programs to increase the available supplies of energy or to reduce energy waste. Energy is pervasive and energy policy must be almost as pervasive: energy use must be a vital component in the planning of transportation, industrial development, land use, community planning and many other economic or social activities.

Because energy inter-relationships run through the whole community, policy planning becomes complex. There is a continuing and growing requirement for co-ordination within the various Ministries of Ontario, among governments and between the public and the private sectors.

This co-ordination now exists to a degree but assuring that all policies are effective and that effort by one agency is not prejudiced by action by another is obviously an on-going and continuous process.

Planning in Ontario should be comprehensive and continuous in meeting the requirements of the "near term", the "transitional phase" and the "long term." It should be equally capable of responding to developments in the area of non-renewable energy research, as well as co-ordinating the policies of the "near term."

APPENDIX B

ONTARIO MINISTRY OF ENERGY

CONSERVATION AND RENEWABLE ENERGY PROJECTS

FISCAL 1977/78

July 31, 1978

Space Conditioning Improvement and Retrofit of Government Buildings.

Ministry of Government Services

A start has been made on the planned 5 year program to reduce energy consumption in buildings owned and operated by the Government. To date about 6 million square feet of the 35 million square feet have been surveyed and implementation of energy conserving measures is proceeding in 2 million square feet.

Thermal Performance Guidelines, Cost/Benefit Analysis and Incorporation of Solar Energy in New Buildings Design

Ministry of Government Services

A start was made on developing compatible computer programs to be used in the design of new buildings. The arrival of the IBM version of CAL-ERDA is being awaited. It is expected that the work can be completed in about 6 months after receipt of that program.

Audit, Operating and Maintenance Procedures (OHC)

Ministry of Housing

A start has been made on improving the energy efficiency of the 65 million square feet involved. This area is nearly twice as large as the 35 million square feet in other Ontario buildings owned and operated directly by the Provincial Government. An energy accounting system is being set up and the maintenance staff in the buildings are becoming involved in the program. As a result of work done to date the building standards for new construction are being upgraded. Additional resources are being applied by the Ministry of Housing to the task, concentrating first on large, high-rise, multi-unit, apartment buildings.

Space Conditioning Audit and Improvement (Hospitals)

Ministry of Health

The funds have been used as "seed" money to carry out energy audits in selected hospitals. The studies identified potential savings which can be obtained by improving operating and maintenance procedures as well as by installing some mechanical improvements.

Space Conditioning Audit & Improvement (Correctional Institutions)

Ministry of Correctional Services

The Ministry of Correctional Services set up a training program for operators in its institutions and arranged for studies to review some buildings. These studies identified worthwhile savings. During the course of the year these activities have been integrated into the program administered centrally through the Ministry of Government Services.

Monitor Two Cambridge Schools.

Ministry of Education

The monitoring of the school which had been extensively modified to reduce energy consumption together with another similar, unmodified school has been completed and a report received from the National Research Council.

Energy Consumption Reports.

Ministry of Education

Data on energy consumption is being collected from School Boards as part of a plan to develop practical methodologies to reduce energy consumption in the Province's schools.

Energy in Society Publication.

Ministry of Education

Five of the nine sections of a curriculum guideline document for distribution to schools have been completed.

Space Conditioning Audit & Improvement (Colleges)

Ministry of Colleges & Universities

The Ministry of Colleges and Universities funded selected projects in certain institutions to demonstrate potential savings which could be obtained by other institutions throughout the province.

Thermography Study - Buildings.

Ministry of Natural Resources

This project clearly demonstrated the usefulness of the detailed infra red photography of individual buildings in detecting areas of high heat loss. The information will be used by the Ministry of Government Services in its government-wide building improvement program.

Building Owners and Managers Association Meeting

Ministry of Energy

The Premier and Minister of Energy addressed senior executives of Toronto's largest developers and owners of office space to stress the need to reduce energy consumption in office buildings and to invite them to participate in a program being co-ordinated by the Ministry. The response to this initiative has been very good.

Municipal Involvement Program.

Ministry of Energy

A start has been made on a plan to reduce energy consumption in public buildings operated by municipalities.

Energy Analysis of Field Production

Ministry of Agriculture & Food

A number of promising methods of reducing energy use in field tillage were investigated. The technical and economic findings are being disseminated through the Extension Branch of the Ministry of Agriculture and Food and the Farm Energy Conservation Education project.

Energy Consumption in Greenhouses

Ministry of Agriculture & Food

The final analysis of the work on soil warming techniques as due in August 1978. Information has already been disseminated to the industry.

Energy Bus

Ministry of Industry & Tourism

The bus continued its highly successful program of providing on-the-spot energy analyses to industries. In the 2 years of its operations it has allowed some 600 companies in the province to identify more than \$31 million in potential energy savings. The concept has now been expanded to a national program by the Federal Government with technical assistance from the Ministry.

Lindsay Thermography Information.

Ministry of Energy

The Ministry in cooperation with the Town of Lindsay planned and managed a community-wide information clinic to present the results of an aerial heat loss survey to homeowners. In addition a trade show was planned and managed in conjunction with the thermography information clinic. Members of about 2100 of the estimated 5000 households attended the 4 day clinic to receive an interpretation of the heat loss from their own homes as detected by the aerial survey.

Home Audit Test (Brockville).

Ministry of Energy

With the active support and participation in Brockville of the Kinsmen Club, the Ministry planned and implemented a project which made available to homeowners a computerized heat loss analysis of their homes. The reports to the homeowners showed those areas where the homeowner could make conservation improvements and an estimate of the costs which would be involved. Approximately 26% (1300) of the homeowners in Brockville availed themselves of this Ministry service.

Lindsay Home Audit (Post Thermography).

Ministry of Energy

This project was modeled on the successful Brockville project and was originally planned to be completed in fiscal 1977/78. The project was planned for delivery in close cooperation with the Town. Due to delays encountered in modifying the computer program and to staff changes in the municipality the delivery was delayed until fiscal 1978/79. Charges were incurred in making necessary computer program alterations and in staff travel to Lindsay for discussions with municipal officials.

Stratford Thermography Information

Ministry of Energy

As one of the four projects in a test program, a thermography information project, patterned on the Lindsay pilot experiment, was carried out in Stratford. Response was so overwhelming during the clinic that many people were turned away. A second clinic, without an accompanying trade show, was organized and run two weeks later. The response level continued to be excellent and a local group who assisted with the second clinic volunteered to continue operating an interpretive facility part time for the first two months of fiscal 1978/79.

Maximum Efficiency Gas-Fired Appliances

Ministry of Consumer & Commercial Relations

The Ministry supported some cost-shared research with the Canadian Gas Association on developing for more efficient appliances. The work has been highly successful and is expected to be completed in 1978/79.

Thermography Data Acquisition

Ministry of Energy

The thermography information clinics generated demands from other communities for similar projects. Those requests which indicated that there may be resources available within the community to sponsor or assist such projects, were prioritized in order of receipt of request and plans were drawn up to fly over and collect data on twelve of these communities. These flights were carried out and preliminary quality checks on the data run prior to the end of fiscal 77/78. These data sets will be developed and used in Thermography Clinics in fiscal 1978/79.

Federal-Provincial Negotiations re CHIP.

Ministry of Energy

During 1977 the Federal Government introduced the Canadian Home Insulation Program (CHIP). Although the concept was excellent the implementation and program details were flawed from an effective conservation perspective and from a provincial point of view. Ministry staff alone and in concert with other provinces were successful in negotiations to have the program altered to better suit conservation needs and provincial goals and priorities.

District Heating - North Pickering

Ministry of Housing

The preliminary engineering design of a district heating system for North Pickering was tendered.

Combined Energy Centre

Ministry Industry & Tourism

A conceptual evaluation of a Combined Energy Centre was initiated, including a review of compatible industries.

Group Heating Redevelopment (St. Lawrence)

Ministry of Energy

Two studies investigating the probable energy requirements and several innovative sources of energy supply for the St. Lawrence redevelopment area in Toronto were completed.

District Heating Implementation

Ministry of Energy

A study of the institutional factors related to actual implementation of district heating was initiated.

Energy Efficient Urban Redevelopment (Sarnia)

Ministry of Energy

A study of the energy requirements and of the availability of heat from industrial sources was initiated.

District Heating Technology Mission

Ministry of Energy

A technology mission to Denmark, Finland and Sweden was sponsored for a group of engineering consultants, energy utilities representatives, architects and government officials to study the transferability to Ontario of recent European experience. A detailed trip report and analysis was commissioned and published.

Energy Conservation in Transportation

Ministry of Transportation & Communications

A. Vehicle and Efficiency Improvement

Simulation studies and engineering analyses were performed for a number of add-on devices and procedures such as periodic engine tune-ups to determine their energy conservation implications. Limited on-vehicle testing was performed.

B. Car and Van Pooling

A review of recent car and van pooling activities in North America was conducted. Changes in the Public Vehicles Act and the Highway Act to permit shared rides were effected.

C. City Street Lighting

A pilot installation of energy-efficient sodium vapour lighting was completed and evaluated. Work was begun on a combined technical and economic information package for municipalities.

Solar Greenhouse

Ministry Agriculture & Food

A report on the work to date has been received. The report identified a number of energy conservation and renewable energy features which can be taken advantage of to reduce the use of fossil fuels. These features are to be incorporated in a demonstration project. In addition some of the conservation features could be more widely applied immediately.

Agricultural Renewable Energy Applications

Ministry Agriculture & Food

From this work has come a multi-year plan to build pilot plant and farm scale installations to demonstrate the direct use of solar energy and the generation of combustible gas from farm wastes.

Solar Demonstration - St. Catharines School

Ministry of Education

The design for an energy conserving school using a solar assisted heat pump system for a an elementary school of 20,000 square feet has been completed. The project has been tendered and construction is proceeding and expected to be completed in September.

Solar Water Heating (Retrofit) - West Humber Collegiate

Ministry of Education

The system is in place and operating. Some modifications are to be made and the system's performance is to be monitored.

Use of Waste Cellulose Fibre as Insulation

Ministry of the Environment

This study on the feasibility of using paper products recovered from municipal waste to make fibre insulation material identified a number of problems. For example, there are problems in the areas of treatment for fire retardancy and protection from microbial degradation. Further work is planned by the Ministry of the Environment in concert with cellulose fibre insulation manufacturers.

Hearst Wood Waste Energy Study

Phase I, the engineering feasibility study has been completed and Phase II, to examine financial options is proceeding.

Refuse Conversion

Ministry of the Environment

A study on refuse conversion in Lindsay has been carried out and the report is due in August 1978.

Residential Solar Furnace Demonstration

Ministry of Housing

Expected to be ready for operation next winter when its performance will be monitored.

Solar Row Housing Demonstration (Saltfleet)

Ministry of Housing

The preliminary design is complete and working drawings are being prepared for a solar space heating system demonstration on a multiple unit residential public housing project. The design of this experimental installation allows for easy comparison with more conventional designs on the same site.

Solar Domestic Hot Water Retrofit

Ministry of Housing

Two installations are expected to be complete by June and the other two should be operational by August and ready for monitoring by next winter.

Alternative Fuels for Vehicle Use

Ministry of Transportation & Communications

Practical experience under Ontario conditions with gasoline/methanol blends has been obtained by operating several vehicles on such a fuel. The preliminary findings were passed on to the Advisory Group on Synthetic Liquid Fuels.

Wind/Diesel Hybrid Demonstration

Ministry of Energy

The test unit was commissioned on Toronto Island and a test program was carried out. Modifications to the equipment and further tests will be made in the summer of 1978.

Solar Heating - Community Swimming Pools

Ministry of Energy

A study of three potential sites for the installation of solar heating was carried out. The report pointed out that in terms of payback time such installations were more attractive than solar space heating in Ontario and recommended that two demonstration systems be considered. One is being installed and a detailed design is being developed for the other.

Solar Heating - Sewage Plants

Ministry of the Environment

A study on the feasibility of using solar heating in a sewage plant concluded that attention to energy conservation and better use of energy sources available in the plant should obviate the need for solar heating systems.

Black Creek Pioneer Village Visitors' Centre - Design

Ministry of Energy

A study of the potential for solar space heating and solar heating for domestic hot water.

City of Ottawa - Solar Water Heating Demonstration

Ministry of Energy

Technical support for a project funded by the City of Ottawa to install solar domestic hot water systems in 2 single family dwellings - one detached and one semi-detached.

Oakville-Trafalgar General Hospital - Solar DHW

Ministry of Health

Preliminary work on this project, to design and install a solar water pre-heating system in the existing hospital was undertaken in 1977/78. The project is very attractive as the high demand for hot water and the cold inlet temperature make the utilization of the collectors potentially very efficient. Such installations are in fact more economical than space heating or domestic hot water heating for residential applications. The detailed design is being developed and installation will follow.

Fuel Conservation in Grain Drying

Ministry Agriculture & Food

Early work in this area had shown that a 2 stage drying process was less energy consuming than the conventional one stage process. Work is now going on to develop methods using solar heating in the second, low temperature, stage to achieve further reductions in fossil fuel usage.

Review of Provident House Heating System

Ministry of Energy

A study was carried out to examine and determine how to correct operational and equipment problems. The report has now been received and its findings are being used to develop long term solutions.

Passive Solar Heating Studies

Ministry of Energy

A report has been received and is being used to develop a methodology to calculate the potential gains from solar heating by passive systems in Ontario.

Aylmer Senior Citizens Home - Solar Space Heating

Ministry of Housing

The Ministry of Energy provided support for tendering for the collectors, and the construction and thermal insulation of the storage tank which is large enough to provide for year round heat storage. Occupancy is planned to take place over the summer and fall of 1978.

Heat Storage in Fused Salt

Ministry of Energy

A report was received on research conducted on a storage system using the melting and freezing of a salt. This approach offers the potential advantage of requiring far less space for storage than a water system of comparable capacity.

Jack Pine Pyrolysis

Ministry of Energy

The products of pyrolysis of jack pine under various pressure conditions were studied. The heat content values of wood waste materials and gases were measured.

Synthetic Liquid Fuels Study

Ministry of Energy

The Advisory Group on Synthetic Liquid Fuels utilizing the expertise of several Ontario Ministries, Ontario Hydro, Federal Government staff and three consultants reviewed the resource base, production technology, utilization and the economics of synthetic liquid fuels with particular attention being given to the indigenous, renewable resources of Ontario (findings and recommendations 1978).

Solar Assisted Heating in a Warehouse

Ministry of Energy

Vertical solar panels have been installed in a warehouse to provide part of the heating requirements and the performance is being monitored.

Farm Energy Conservation Education

Ministry Agriculture & Food

The Ministry of Agriculture and Food ran (and continues to run) this information dissemination project. It is especially tailored to deliver information on energy conservation and renewable energy to the farming community.

Fiscal/Legal Policies

Ministry of Energy

Studies were carried out on the fiscal incentives for energy conservation and renewable energy and some recommendations have been adopted in the Treasurer's Budget. Research was also carried out on the issue of legal rights on solar access to support the Ministry's working paper which has been published.

Energy Conservation in Capital Projects

Ministry of Energy

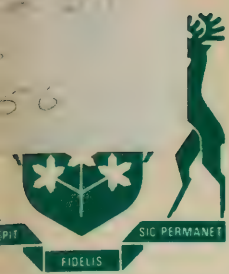
The Ministry succeeded in its efforts to influence the construction of the new Massey Hall in accordance with the proposed energy code.

Solar Booklet

Ministry of Energy

A 44 page booklet on solar energy was prepared and produced. The work included layout, artwork, typesetting, assembly and printing of 40,000 copies which were distributed initially to 15,000 interested groups and individuals and later, as single copies, on request to Ontario residents at no charge. Bulk and out of province requests are being handled through the Ontario Government Bookstore at \$1.00 per copy.

The booklet, entitled "Turn On The Sun" was written for the intelligent layman and interested homeowner and has been very well received by the media and general public. The demand has been such that a second printing is planned for the summer of 1978.



ANNUAL REPORT OF THE MINISTRY OF ENERGY YEAR ENDED MARCH 31, 1979

Ontario



A lonely telecommunications tower stands in the vast James Bay Lowlands area where Ontario's only known lignite coal deposit, Onakawana, may one day contribute significantly to Ontario's energy supplies. A \$6-million study, funded by the private sector and Ontario Hydro is examining the potential of constructing a lignite-fired electric generating station at the site.

Photo courtesy Ontario
Ministry of Natural
Resources



Good Public Imp

Ministry of
Energy

Queen's Park
Toronto Ontario

ANNUAL REPORT

Year Ended March 31, 1979



Minister

Ministry
of
Energy

Queen's Park
Toronto, Ontario
M7A 2B7
416/965-4286
Telex 06217880

October 1979

TO THE HONOURABLE PAULINE M. MCGIBBON
O.C., B.A., LL.D., D.U. (OTT)

Lieutenant-Governor of the Province of Ontario

MAY IT PLEASE YOUR HONOUR:

I take pleasure in submitting the Sixth Annual
Report of the Ministry of Energy for the fiscal
year ended March 31, 1979.

Respectfully submitted

A handwritten signature in cursive script that reads 'Robert Welch'.

Robert Welch
Minister of Energy



Office of the
Deputy Minister

Ministry of
Energy

Telex
Enrgy Tor
06-217-880

Queen's Park
Toronto Ontario

October 1979

TO THE HONOURABLE ROBERT WELCH, Q.C.
Minister of Energy, Ontario

Sir:

I have the honour to present the Sixth Annual
Report of the Ministry of Energy for the fiscal
year ended March 31, 1979.

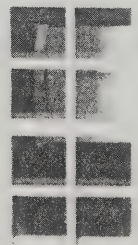
Respectfully submitted

A handwritten signature in cursive script that reads "Malcolm Rowan".

Malcolm Rowan
Deputy Minister

Rooftop solar collectors
facing south absorb heat
from the sun's rays.

SOLAR COLLECTORS



How much hot water can
be heated by solar energy
depends on the size of the
solar system, the amount of
hot water required, and the
availability of sunshine.

The solar collectors
pump water from the
tank that contains the
water being heated
the tank



The sun
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Ontario Energy Minister Robert Welch pays a visit to the Ministry of Energy's display booth at the Energy Lifestyle Show which shows homeowners how solar energy can be used to help heat domestic hot water.

MINISTRY OF ENERGY

ANNUAL REPORT

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DEPUTY MINISTER'S SUMMARY

This past year has been an important one for the Ministry of Energy. Once again, the Ministry dramatically increased its emphasis on conservation and renewable energy programs, while launching a number of new and important initiatives in the conventional energy area -- ranging from new incentives to develop the Onakawana lignite site in Northeastern Ontario to initiating, along with the Federal Government, the first phase of a program to demonstrate the safe, permanent disposal of nuclear waste materials.

The policy document, Ontario's Energy Future, published in April 1977, continued to provide the policy framework around which the Ministry initiatives were developed.

The Ministry's near-term strategic emphasis is to obtain the maximum potential from conventional energy sources, with its long-term emphasis on renewable sources of energy.

With such aims in mind, the Ministry launched significant new programs in conservation during the year, and participated in more than 100 energy conservation and renewable energy projects, many involving other Ministries of the Ontario Government.

One such initiative, the Downtown Program, was launched on April 4, 1978 jointly by Premier William Davis, the Minister of Energy and the Chairman of Ontario Hydro. Its aim was to develop leadership in wise energy use by voluntary assistance from 46 major building owners, managers, and tenants in the downtown Toronto core by working with assistance from the Ministry to develop programs tailored to meet the needs of their particular buildings and businesses.

In July 1978, the Ministry began the first step in one of its major initiatives to stimulate a province-wide conservation effort by launching the Municipal Program -- a venture aimed at encouraging Ontario's more than 800 municipalities to conserve energy in their buildings and operations, and both to save taxpayers' dollars.

In October 1978, a Joint Steering Committee was appointed through the Municipal Liaison Committee and the Association of Counties and Regions of Ontario to work with the Ministry to provide leadership in promoting energy conservation among the municipalities of the Province. It is estimated that a typical municipality of 70,000 residents spends about \$1-million a year on energy, and that a minimum of 10 per cent of this total could be saved by implementing conservation programs in the operation of buildings, fleets of vehicles and in providing for such other municipal services as more efficient street lighting.

The conservation program for municipalities was complemented by a number of conservation initiatives in related areas. These included:

- a comprehensive study of conservation measures which could be implemented in Ontario's more than 900 municipally-owned arenas and which were reported to the Arenas Association in June,
- a seminar on aspects of district heating also in June,
- an energy conservation program for shopkeepers at Fairview Mall in November,

- a cogeneration seminar in December,
- and a study to pinpoint energy savings in sewage treatment plants.

In renewable energy, too, it was an important year for Ontario.

In May, the Ministry released for discussion a paper on solar rights entitled Perspectives on Access to Sunlight which discusses right to sunlight issues and the potential impact of "right to light" on land use. In June, an eight-part series, The Report of the Advisory Group on Synthetic Liquid Fuels was released by the Minister as the culmination of an exhaustive study, involving representatives from the private sector and the Federal and Provincial Governments. The study investigated the potential that such fuels as ethanol, methanol and alcohol might hold as a substitute for petroleum in transportation in Ontario.

In September, Canada's first solar-heated school -- Applewood Public School in St. Catharines -- opened its doors to students. The school, a joint project of the Lincoln County Board of Education, the Ministry of Education and the Ministry of Energy, is equipped with a solar system that is designed to provide three quarters of the heating requirements of the building.

In September, the Ministry participated in the official opening of West Humber Collegiate Institute's solar hot water system in which it played a part; in November, a monitoring of the solar hot water heating system at the Richmond Hill municipal swimming pool began.

In March, the Ministry announced that it had been assigned prime responsibility for Energy from Waste projects and began steps to place greater emphasis on this area of activity across the Province, in co-operation with the Ministry of the Environment.

It was also a most active year in the conventional energy field.

The Ministry continued to intervene on behalf of Ontario consumers at hearings of the National Energy Board (NEB) and before the Alberta Resources Conservation Board on matters affecting oil and natural gas supply. Formal presentations to the NEB were made on crude oil supply and demand in June 1978 and on natural gas supply and demand in September 1978. A presentation was also made to the Natural Resources Committee of the Canadian House of Commons on Bill C-42, the Energy Supplies Emergency Act.

In June, the Minister issued a joint statement with his Federal counterpart on a program for testing and demonstration of the safe, permanent disposal of nuclear waste materials in Ontario. Testing and analysis of rock samples and the suitability of the Canadian shield is to begin later in 1979 by Atomic Energy of Canada Ltd., which has prime responsibility for the waste disposal program.

Another new initiative was the launching of a \$6-million study by Onakawana Developments Ltd. and Ontario Hydro into the potential of burning lignite coal from the site, in the James Bay lowlands basin, to fuel a 1,000-megawatt electric power generating plant site.

One of the year's highlights was the participation by the Ministry at the opening of the Syncrude oil sands project in Alberta during September, followed by the sale in December of the Ontario Energy Corporation's five per cent share in the Syncrude project -- at a profit for the Government of \$35-million.

Continuing its efforts to restructure electric power utilities in Ontario, the Ministry received Legislative approval for restructuring in York Region and Niagara Region during the fiscal year, and a Bill was introduced for restructuring in Niagara region.

The Ministry made a number of presentations to the Select Committee on Ontario Hydro Affairs at the request of the Committee.

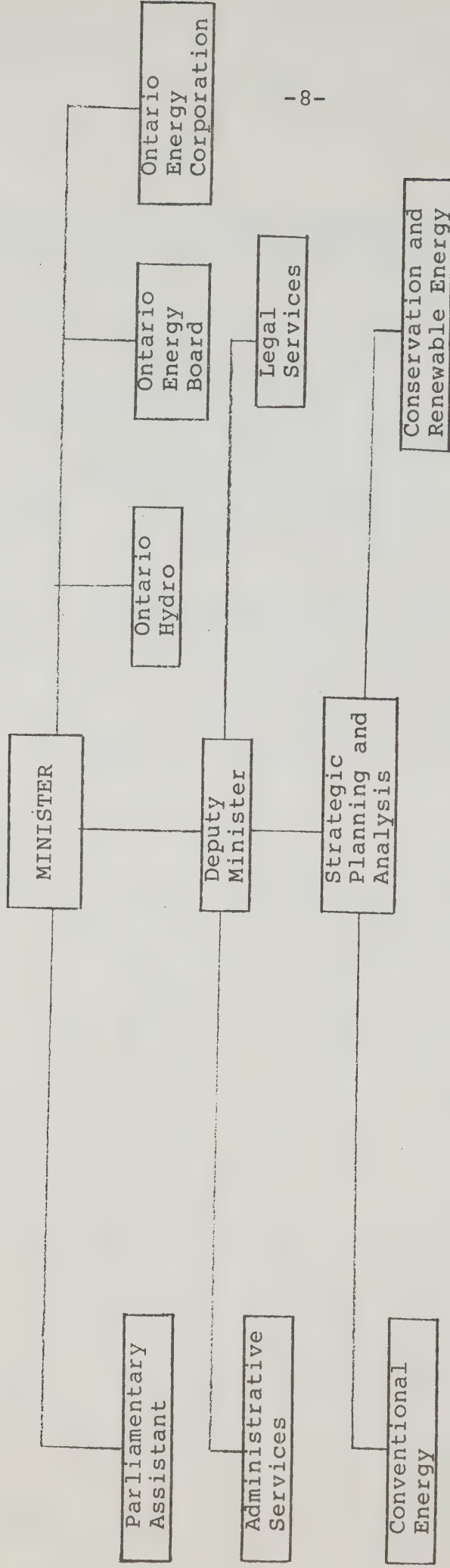
During the year, important new greenhouse projects -- designed to make effective use of waste warm water from Ontario Hydro's nuclear generating stations -- were launched at Pickering and Bruce, under the direction of the Ontario Energy Corporation (OEC). The development of an AgriPark project at Bruce, with considerable support and funding from the private sector, was developed by the OEC in conjunction with the other participants of the Bruce AgriPark Joint Venture.

In addition to the Ministry's Annual Report, separate Annual Reports are published by Ontario Hydro, the Ontario Energy Board and the Ontario Energy Corporation.

Copies of the Energy Board and Energy Corporation's Annual Reports may be obtained through the Ontario Government Bookstore. Ontario Hydro's Annual Report may be obtained from Ontario Hydro, 700 University Avenue, Toronto, Ontario. M5G 1X5

MINISTRY OFFICE ORGANIZATION

(Total Classified Staff
as of March 31, 1979 - 62)



THE CHANGING ENERGY SCENE

Prior to the 1973 oil embargo, the Ontario Government recognized that significant changes with respect to energy should be anticipated. A June, 1973 report to the Premier emphasized the need for Ontario to moderate its energy demands through efficiency and conservation as well as to assure that adequate supplies of energy would be available to the province. Legislation establishing the Ministry of Energy to discharge these responsibilities was formally proclaimed on July 3, 1973.

The over-riding fact in the energy situation in Ontario is our reliance on sources beyond our provincial boundaries for about 80 per cent of our energy requirements. In this context, the Ministry of Energy is responsible for the development and implementation of a provincial energy policy, designed to ensure that Ontario consumers receive an adequate and secure supply of energy at reasonable prices with an acceptable environmental impact.

As a predominant factor in contemporary society, energy influences the lifestyle of the individual. To a large extent, energy also exerts an influence in the formulation of tax laws, transportation policy and community planning, as well as affecting decisions in the industrial and commercial sector.

The uncertainties of world energy supply have recently been underlined by the crude oil production cuts due to the revolution in Iran. Fortunately, Canada is better placed over the longer term than most developed countries to withstand world oil shortages because of its vast undeveloped reserves of fossil fuels.

Developing Canada's remaining fossil fuel reserves will be expensive, because they consist mainly of heavy oil deposits, oil sands, coal and frontier oil and gas, requiring large capital-intensive projects. But if Canada firmly commits itself to developing these reserves to the point of self-sufficiency, our national energy future can be assured. If promptly developed, these reserves could mean security of supply for years to come for Ontario, the industrial heart of the country.

For crude oil and its derivatives, the importance to Ontario of prompt development of the Western Canadian oil sands and frontier oil reserves is an obvious and necessary protection against a likely world shortfall in supply and against the extremes of cartel-induced price increases.

Not all parts of Canada and the United States have been affected equally by rising energy prices. Summarizing recent energy price increases, research shows Ontario to be fairly fortunate compared to other jurisdictions. For instance, Ontario communities pay less for electricity than most other North American cities (Figure I). And when it comes to industrial electricity rates, Ontario is one of the more fortunate provinces, with rates much lower than in other industrialized parts of the world (Figure II).

As pointed out in the Ministry of Energy's 1977 publication Ontario's Energy Future, Ontario will have to reduce over the next fifty years, its reliance on non-renewable crude oil and natural gas and turn increasingly to energy from renewable sources.

Renewable energy sources accounted in 1978 for almost 13 per cent of the province's energy supply, primarily water-power.

FIGURE I Residential electrical bills – July 1978

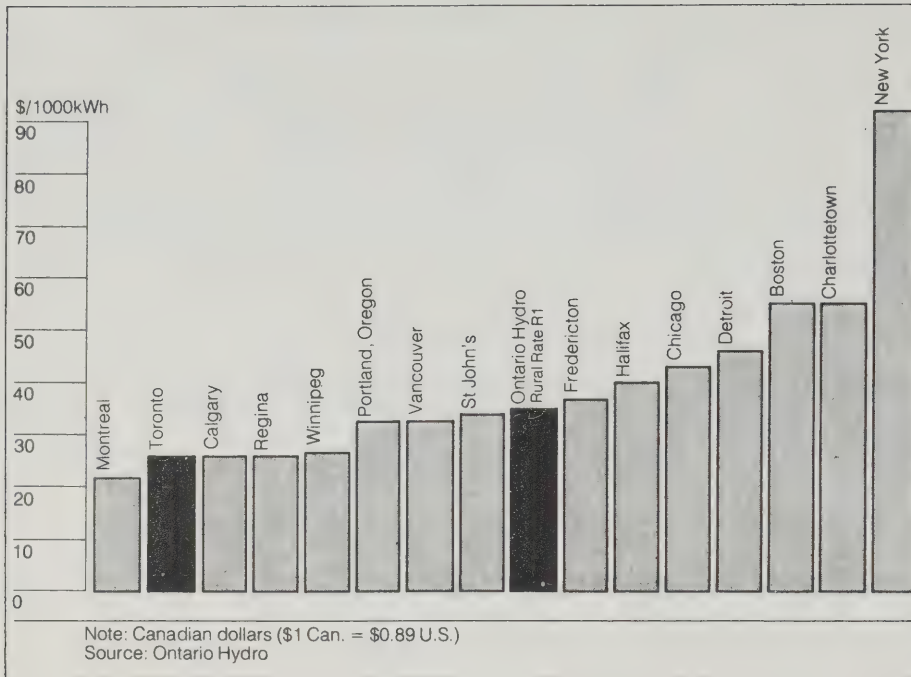
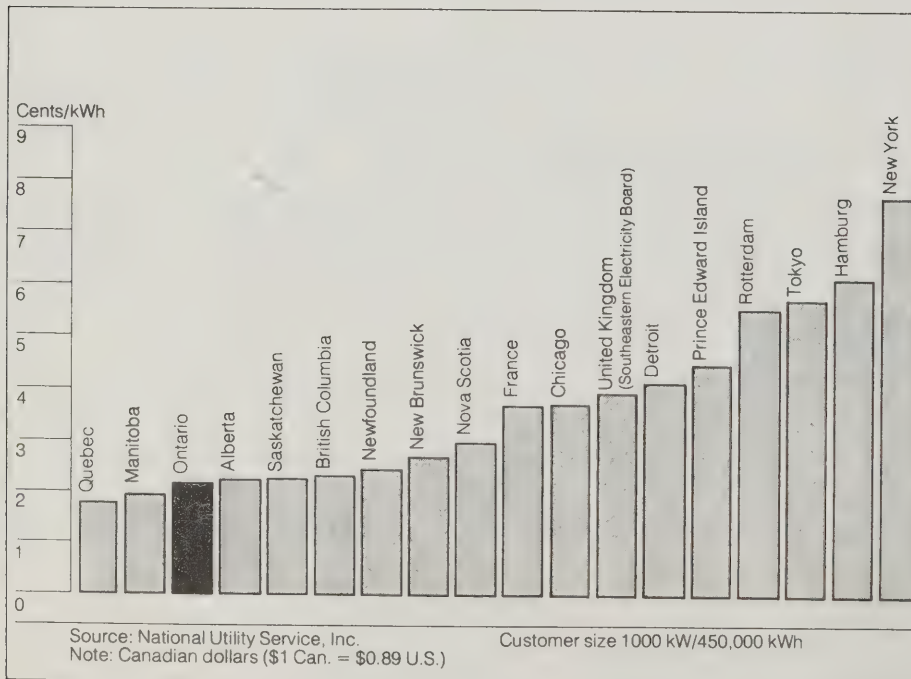


FIGURE II Industrial electricity rates – March 1978



Economical renewable energy is crucial to Ontario's long-term energy security, and the Ontario Government has been contributing substantially to its development. Under the new five-year, \$58 million Canada/Ontario bilateral energy agreement, the Ontario Government will contribute \$29 million for demonstration of new technology in renewable energy and energy conservation; this sum will be matched by the Federal Government.

Of the many types of renewable energy, some, such as geothermal and tidal, are not practical in Ontario. Others, such as photovoltaic conversion of sunlight to electricity, would require major research programs, like those currently being carried out in the United States. As a result, Ontario's renewable energy program concentrates on three main areas: energy from renewable organic materials and wastes; solar space and hot water heating, and systems in remote areas (wind and small-scale hydraulic systems for the generation of electricity).

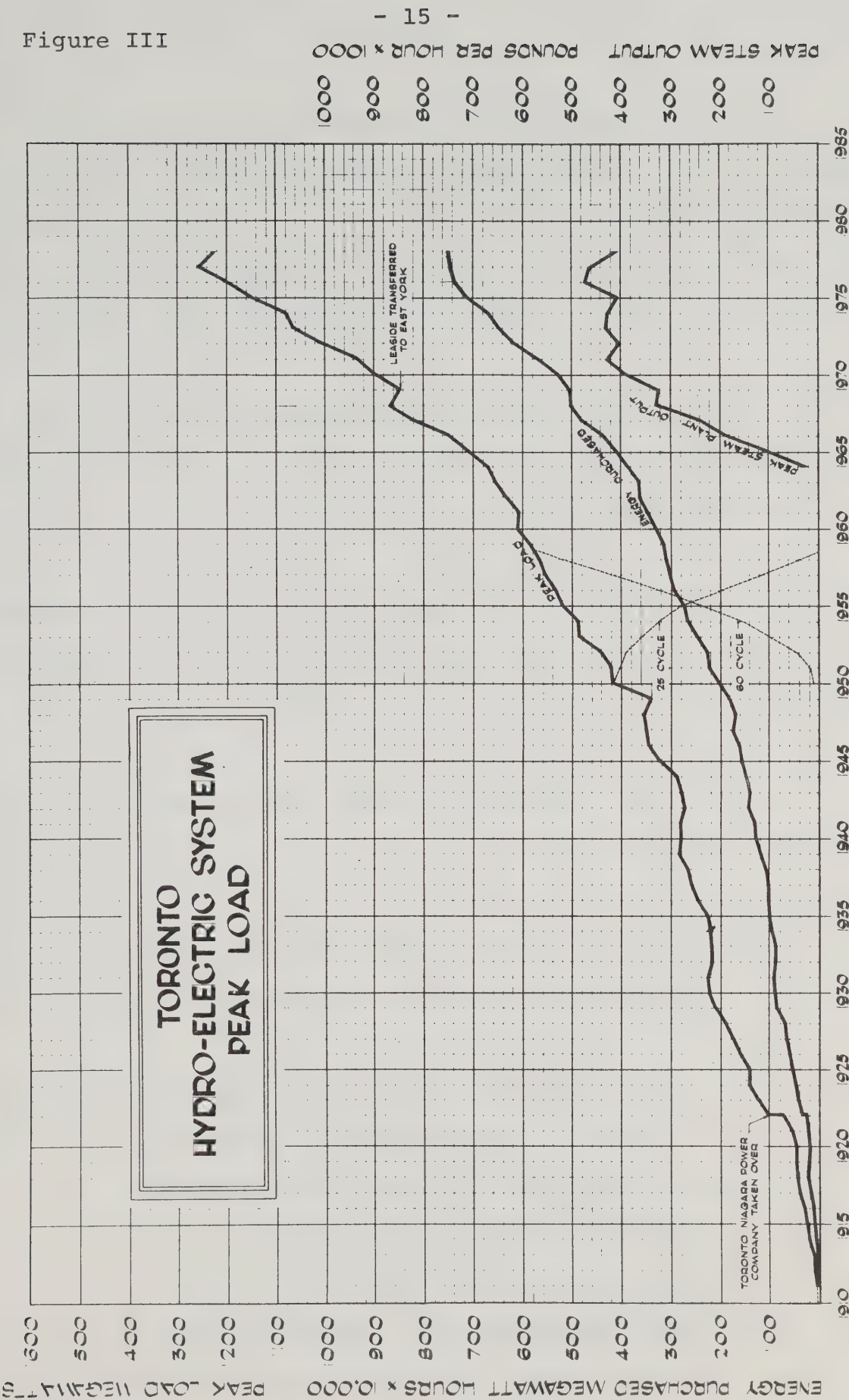
Like renewable energy, energy conservation in Ontario is a desirable and increasingly essential activity. To this end, a goal has been set to reduce the provincial rate of growth of demand for energy reduced to two per cent a year by 1985. This compares with a growth rate of 3.9 per cent from 1966 to 1976.

By initiating, co-ordinating, and funding various energy management programs, the Ministry's goal is to encourage voluntary energy conservation efforts by citizens of Ontario, based on enlightened self-interest.

Recent indications suggest that the public is becoming more conscious of the importance of energy conservation and that energy consumption is being reduced. The Canadian Gas Association's recent analysis of the annual consumption of natural gas per residential space-heating customer indicates that in Ontario, between 1972 and 1977, the average space heating use per customer, after adjustment for temperature variations, decreased by 7.9 per cent.

In the City of Toronto, recent figures from Toronto Hydro show electricity demand grew during 1978 only one-half of 1 per cent, compared to past years when the annual growth rate was 5 per cent. There has also been an actual reduction in peak load, the first significant reduction since 1911 (barring minor anomalies such as conversion to 60-cycle and transfer of Leaside customers to the East York system). (Figure III)

Figure III



The Ministry has developed a forecasting model that enables us to project energy demand over the next twenty to twenty-five years using a variety of different assumptions. The model is useful for quantifying the effect on future energy use of technological changes and socio-economic developments.

Using this forecasting model, the Ministry has developed three plausible alternative energy futures or 'cases' for the province.

These models were presented in detail and discussed at the Select Committee on Ontario Hydro Affairs in February of 1979.

The major assumptions made by the Ministry in all three cases are as follows:

- there will be no major technological breakthroughs affecting energy use;
- only policy measures that are currently implemented, or widely accepted as sure to be implemented, are considered;
- no major social or political upheaval will radically change the structure and pattern of energy use;

- the marketplace will continue to determine resource allocations;
- consumers will actively pursue energy conservation opportunities;
- alternative energy sources will make only a very small contribution to Ontario's total needs during the next twenty years;
- the Ontario economy and population will develop along the lines forecast by the Ministry of Treasury and Economics.

The three cases differ only in their assumptions regarding energy price, fuel availability, energy use efficiency, and technology. They can be described as follows:

Case 1: Current Trends assumes only those energy use technologies currently in commercial application. Canadian oil prices approach world oil prices by the early 1980s and stay at world levels thereafter, increasing slowly in real terms till 2000. The different fuels become more price-competitive, but their relative positions remain unchanged.

Case 2 Low Energy Use assumes more rapidly increasing energy prices and higher levels of conservation in the later years. Natural gas, coal, and electricity prices maintain the same competitive relationship with oil as in Case 1.

Case 3: Uncertain Oil and Natural Gas Supplies reflects mounting concerns about oil and natural gas availability, leading to increasing choice of electricity, coal and alternative energy sources, together with further adoption of new energy use technology.

A more detailed description of the different assumptions used in the three cases is presented in Appendix A to this Annual Report.

Two interrelated uncertainties of energy supply confront Ontario and Canada: crude oil supply disruptions by the major producing countries and failure to proceed with timely development of oil sands, heavy oil, and frontier energy sources. Solving the second uncertainty will, in the longer run, eliminate the first.

A greater degree of Canadian energy self-sufficiency seems possible and with it the prospect of freeing Ontario from many of the consequences of world energy disruptions. The province will, of course, never be totally isolated from world energy problems.

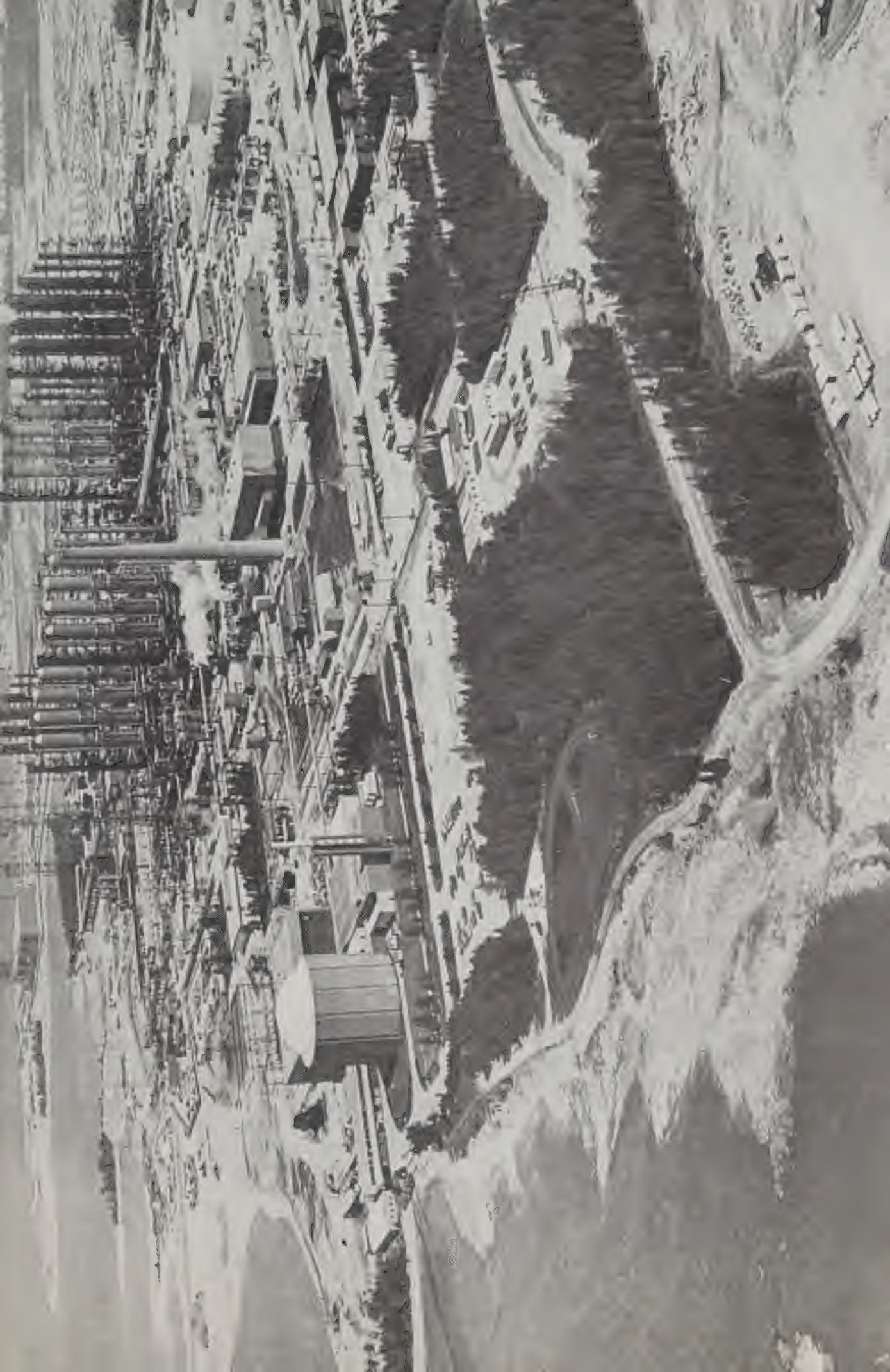
But with self-sufficiency of oil assured and with serious conservation efforts, the worst effects of a world crude oil shortage could be alleviated.

It is with this framework in mind that the Ministry's programs have been designed.

PROGRAM STRUCTURE

The Ministry of Energy functions within the framework of five specific programs:

- Conventional Energy
- Renewable Energy
- Energy Conservation
- Energy Regulatory Affairs
- Energy Supply



The Bruce Nuclear Power Development on Lake Huron, near Kincardine, is Canada's largest nuclear power complex. It accommodates a 3,200-megawatt, four reactor nuclear plant, Bruce A, as well as a much smaller reactor, the 200-megawatt Douglas Point Generating Station, three heavy water plants, and a proposed 3,200-megawatt Bruce B nuclear generating station, now under construction.

Photo courtesy
of Ontario Hydro

CONVENTIONAL ENERGY PROGRAM

This program is responsible for conventional energy policy development in the following areas:

- electricity;
- crude oil;
- natural gas;
- lignite and coal;
- uranium;
- petro-chemicals and petroleum products.

The following considerations are implicit in the objectives of this program:

- to review energy matters on a continuing basis, particularly as they relate to supply, demand and transport of conventional energy resources;
- to ensure adequacy and security of conventional energy supplies at fair and reasonable prices and with acceptable environmental impact;
- to advise the Government on matters of conventional energy and related policy;
- to represent the Government's policy position and protect its interests before Federal and Provincial regulatory authorities;
- to co-ordinate the conventional energy-related activities of the Government, including policy direction to Ontario Hydro and technical support to the Ontario Energy Board.

During the past year, the Ministry has taken the following conventional energy policy initiatives:

A. Electricity

(i) Project Approval

As part of the Minister's responsibility for Ontario Hydro, he makes recommendations to Cabinet concerning Ontario Hydro's expansion plans. Each project requires final approval by the Lieutenant-Governor-in-Council. During the past year, the following projects have passed through this procedure:

- construction of a 500 kV transmission line from Claireville Substation (Woodbridge) to Cherrywood Substation (Pickering)
- construction of low voltage substation and distribution lines in the following areas:
 - Otanabee Township - Peterborough Substation
 - Nepean Township - Substation
 - Oxford County - Distribution Line
 - Stephen Township - Substation
 - Sandwich East Township - Substation
 - Grantham Township - St. Catharines Substation

(ii) Rates and Charges (Bulk Power Rates) of Ontario
Hydro for 1979

On April 28, 1978, The Chairman of Ontario Hydro submitted a proposal to the Minister of Energy to increase bulk power rates to municipal hydro utilities and direct industrial customers for 1979. The proposal was referred to the Ontario Energy Board (OEB) for review in accordance with section 37A of the Ontario Energy Board Act.

In its proposal, Ontario Hydro sought to raise its bulk power rates to its municipal utilities by an average 9.8 per cent and to increase its rates to direct industrial customers by an average of 10.1 per cent.

Ontario Hydro indicated that revenue for 1978 was in excess of net income allowed under the anti-inflation guidelines. The excess revenues would therefore be rebated to customers during 1979, and the level of the 1979 rate increase would be lowered. The anti-inflation program ended at the end of 1978. Nevertheless, Hydro's 1979 rate increase proposal was such that it would have conformed to the allowable net income had anti-inflation guidelines still been in effect.

Following 15 days of public hearings, the Ontario Energy Board submitted a report endorsing the rate increase proposal by Ontario Hydro. Ontario Hydro's Board of Directors announced the new rate schedule in October and the rate increase was implemented as of January 1, 1979.

(iii) Expropriation Approvals

During the year, the Minister of Energy approved the expropriation of land for the following Ontario Hydro Projects:

- | | |
|-------|---|
| OH-66 | Gretna Junction to Picton Transformer Station, 230 kV transmission line: May 2, 1978; |
| OH-67 | Porcupine Transformer Station to Texas Gulf Canada, 230 kV transmission line: April 17, 1978; |

(iv) Select Committee on Ontario Hydro Affairs

In November, 1977, a Select Committee of the Legislature was appointed to examine certain aspects of Ontario Hydro's operations. During the 1978-79 fiscal year, the Select Committee inquired into the construction of heavy water plants at the Bruce Nuclear Power Development. It also examined Ontario Hydro's heavy water supply and demand. The Committee's report was released in October 1978. The Minister and the Deputy Minister appeared before the Select Committee on two occasions and responded to questions concerning the Government approval process.

From January to March, 1979, the Select Committee held hearings to examine the components of energy supply and demand. From these hearings, the Select Committee intended particularly to arrive at conclusions regarding demand for electricity.

The Ministry made three presentations during these "demand for electricity" hearings. They consisted of the following panels:

- 1) conventional energy supply and demand panel
- 2) energy conservation and renewable energy panel
- 3) energy demand models panel.

A fourth panel, comprised of the Deputy Minister and the Chairmen of the other three panels, addressed questions related to energy policy.

The Ministry also tabled a report in the Legislature concerning the status of actions relating to the 1976 Select Committee recommendations on energy conservation and load management.

A preliminary review of radioactive fuel waste management and nuclear safety was conducted by the Select Committee. The Select Committee will continue its investigation into nuclear safety during the summer of 1979.

(v) Northern Electrification

Electric power is made available to certain Northern Ontario communities not currently served by the Ontario Hydro transmission system. This is done under the aegis of the Ontario Government's Program for the Electrification of Remote Northern Communities. This \$3 million, 3-year program was announced on December 15, 1976. Under its terms, the Province provides Ontario Hydro with capital funds for local diesel generation, small hydraulic generation or extensions to existing transmission lines.

Facilities in Hillsport, Oba, Armstrong, and Biscotasing are now on line.

Feasibility studies are underway in Sultan. As well, Auden may be eligible for service in 1980, depending on the outcome of a survey of the number of customers.

(vi) Municipal Hydro Restructuring

The major restructuring of local government in the early 1970s and the establishment of many new municipal boundaries created the need to examine the restructuring of the jurisdictions of retail electrical distribution authorities.

In 1973, the Government appointed Mr. William Hogg of Sault Ste. Marie, Chairman of a Committee to report on and make recommendations for municipal hydro restructuring both for regions and restructured counties. In February, 1975, The Hogg Report, as amended, was tabled in the Legislature and adopted as a guideline for local study groups. At the same time, a provincial Steering Committee on Municipal Hydro Restructuring was set up to co-ordinate the local studies in accordance with the provincial guidelines. In addition, the Committee was to provide an organization for reviewing and implementing these local studies.

Since that time, restructuring studies have been initiated in ten regions and counties. Legislation has been enacted for the following Regional Municipalities: Waterloo and Peel (July, 1977); the County of Oxford (December, 1977); York (June, 1978); and, after the close of the fiscal year, for Niagara (May, 1979); and Halton and Durham (June, 1979). The restructuring legislation to date has provided for the transfer of 75,000 rural customers (approximately nine per cent of the total number of Ontario Hydro's rural customers) to municipal utilities. During 1978, a total of 31,000 rural customers were transferred.

Restructuring studies are in the final stages in the Regional Municipalities of Hamilton-Wentworth, Sudbury and Ottawa-Carleton.

The Provincial Steering Committee for the Restructuring of Municipal Utilities was dissolved at the end of December, 1978 as its work had been essentially completed.

(vii) Methods of Electrical Metering

As indicated in the Annual Report for the year ending March 31, 1978, a Tri-Party Committee investigated the energy and dollar benefits and disadvantages of banning bulk metering in Ontario for new construction of multiple unit residential dwellings. The Tri-Party Committee was composed of representatives from Ontario Hydro, the Ontario Municipal Electric Association and the Association of Municipal Electrical Utilities. After more than a year of study, the Tri-Party's final report was tabled in the Legislature on December 15, 1977.

Copies of the report were sent to a number of groups and individuals for comment. Responses have been received from most interested organizations and these have been reviewed by Ministry staff.

It is expected that policy recommendations will be brought forward to Cabinet later in 1979. These recommendations will be based on an analysis of the Committee's recommendations as well as the reaction of the various interested groups and the public.

(viii) Electricity Costing and Pricing Study

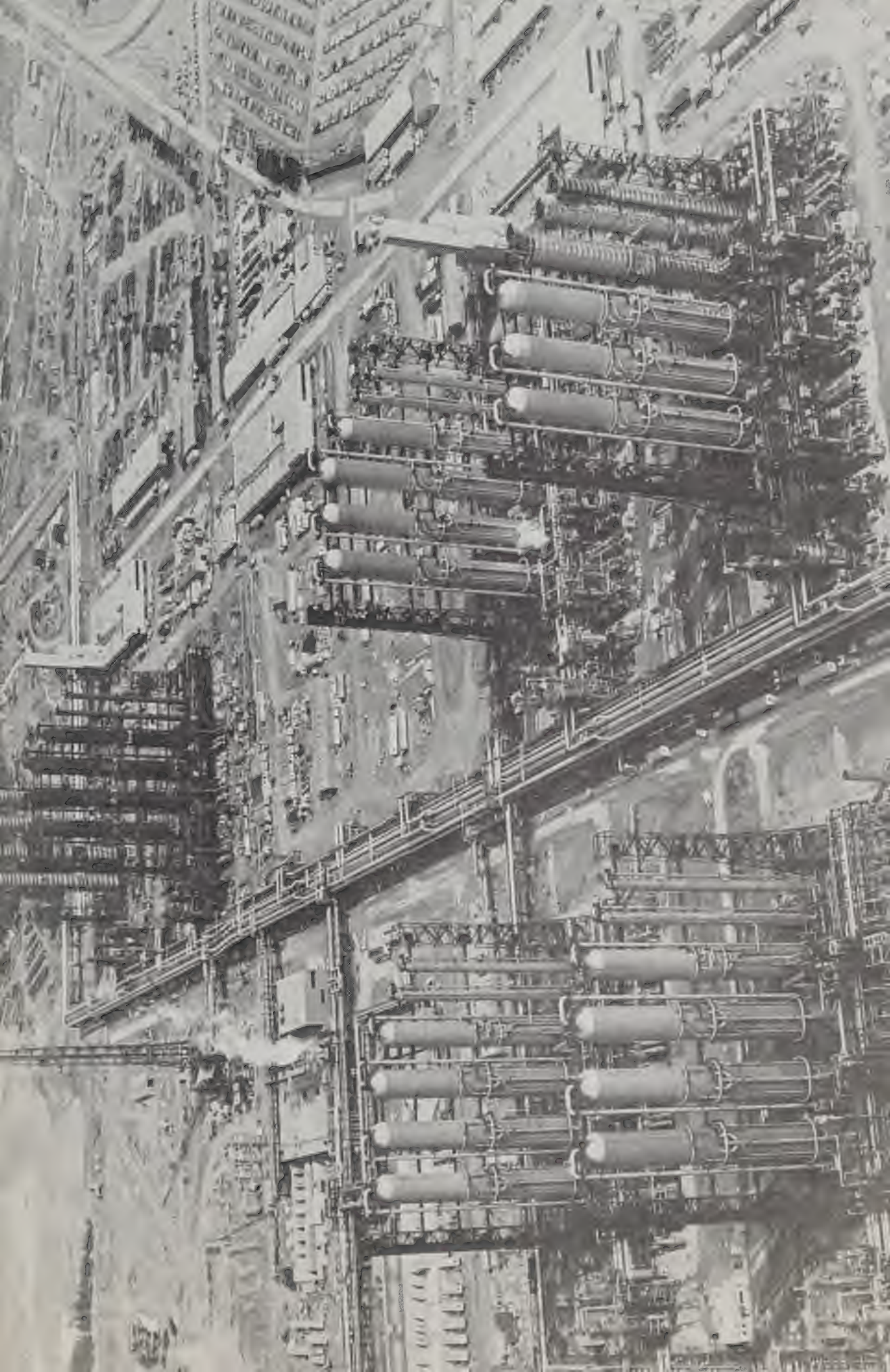
In 1978-79, the Ontario Energy Board continued its hearings into electricity costing and pricing principles appropriate for use by Ontario Hydro. This issue had been referred to the Energy Board by the Minister of Energy in February, 1977. The Energy Board was asked to include in its review the comprehensive study on this topic; Ontario Hydro's Board of Directors had submitted their study to the Minister of Energy in October 1976, and the OEB began its hearings in March, 1977. During the fall of 1978 and early in 1979, the Energy Board completed the fifth and final phase of hearing evidence. The final arguments from all participants were scheduled for completion by spring of 1979. The Ontario Energy Board is expected to submit its final report on electricity costing and pricing principles to the Minister of Energy by autumn, 1979.

(ix) Load Forecast

Ontario Hydro's 1978 forecast of demand for electricity was monitored against month-by-month actual peak and average energy demands; deviations from assumed weather conditions were also taken into account. A possible shortfall in forecast demand was indicated and this was assessed in co-ordination with staff responsible for developing the Ministry of Energy's energy demand model. Concurrently, the possible implications of lower demand for Ontario's current capital construction program were discussed with Hydro officials.

Ontario Hydro Generation Construction Program

Early in 1979, the Ontario Hydro Board approved a new load forecast which was lower than the 1978 forecast. At that time, the Ontario Hydro Board also announced its decision to stop construction and store the completed portion of the oil-fired Wesleyville Generating Station. The Board initiated an analysis of the other generating stations under construction to determine whether adjustments to their construction schedules would be appropriate.



Ontario's three heavy water plants tower above the site at the Bruce Nuclear Power Development. One plant, Bruce HW Plant A, has been in successful operation since 1973. The first half of a second plant, Bruce HW Plant B, is scheduled to be in service in November, 1979 with the second half in service in March 1980. Work on the construction of a third plant, Bruce HW Plant D, will be terminated at the end of 1979 and the plant will be mothballed for the time being.

Shortly after the end of the fiscal year, the Hydro Board announced its decision to stretch out the construction of the Bruce B, Atikokan and Darlington Generating Stations over a longer period of time. The longer term construction schedule will bring installed generating capacity more quickly into line with forecast demand.

A surplus in generating capacity is expected to remain through the 1980s. The Government views this situation positively in view of the current world energy situation and the potential for exports of surplus power to the United States. The longer term construction schedule will also maintain a significant level of employment and ongoing economic activity.

No major new generation projects were approved by the Lieutenant-Governor-in-Council during the fiscal year.

Heavy Water Rationalization

Because Ontario Hydro revised its load forecast and stretched out its construction program, a continuing reassessment of its future heavy water needs was required.

The construction of heavy water plants at Bruce was of prime concern to the Ministry. Ministry staff participated in discussions with Ontario Hydro, the Federal Government and

Atomic Energy of Canada Limited (AECL), regarding this construction. Ministry staff also participated in hearings of the Select Committee on Hydro Affairs which held a July, 1978 inquiry into the construction of heavy water plants at Bruce. The Committee's final report, issued in October 1978, recommended that Ontario Hydro complete the first half of Heavy Water Plant - D and to either postpone the decision to commission the plant or mothball it until the plant had been completed (1981). The Select Committee recommended that construction of the second half of D plant cease and the equipment be stored for use at some future date.

By May 1978, it became apparent to the Ministry of Energy, that potential overproduction of heavy water was a national problem. The Federal Government had announced resumption of work on the LaPrade heavy water plant in Quebec with a planned capacity of approximately 80 per cent of a Bruce heavy water plant. Analysis of Canadian supply and demand for heavy water by Ontario Hydro and the Ministry of Energy indicated that with the lower Ontario Hydro forecast demand, Bruce Heavy Water Plant - D could reliably supply heavy water for use outside Ontario. As well, the price would be more attractive than the price planned for the LaPrade plant. The Minister of Energy made a statement in the Legislature on June 8, 1978. He called for a rationalization of Canadian heavy water production and marketing. Talks to be held on a

continuing basis were begun with Ontario Hydro, the Federal Government and AECL on means of bringing supply and demand into balance in a Canadian context.

In September, 1978, the Federal Government cut back expenditure on the LaPrade plant as part of an overall government cost-cutting program. In December, 1978, Ontario Hydro announced the mothballing of the uncompleted second half of Bruce Heavy Water Plant - D.

The following table gives the status of heavy water production capability at the end of the fiscal year.

The Status of Heavy Water Plants
in Canada, March 31, 1979

Plant	Owner/ Operator	Capacity (kg/hr)	Status
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Port Hawkesbury, N.S.	AECL	46	In operation 1970
Bruce - A, Ont.	OH	105.6	In operation 1973
Glace Bay, N.S.	AECL	32	In operation 1976
Bruce - B, Ont.	OH	105.6	First production 1979
Bruce - D, Ont.	OH	105.6	First half com- pleted 1980 Second half moth- balled
LaPrade, Quebec	AECL	82	Construction sus- pended 1978.

(x) Royal Commission on Electric Power Planning
 (R.C.E.P.P.) and its Implications for System
 Expansion Program

In July, 1978, the terms of reference under which the R.C.E.P.P. would review the need for a number of bulk power facilities in Southwestern and Eastern Ontario were revised. This was done to allow the R.C.E.P.P. to schedule public meetings on the question of "need" for such facilities prior to their review before the Environmental Assessment Board. In view of a changed forecast of demand, the North Channel generation project was no longer considered a priority project.

For the other regions, the R.C.E.P.P. was asked to report on regional load forecasts and the capability of existing and committed facilities to supply load to these regions. The Commission was also asked for a report on the dates at which additional facilities, if any, would be needed. These reports were to be submitted to the Minister of Energy by the end of May, 1979, for Southwestern Ontario and by the end of June for Eastern Ontario. Consequently, the Commission announced that it would hold public hearings for Southwestern Ontario in March, 1979, and in April, 1979, for Eastern Ontario.

In September, 1978, the R.C.E.P.P. submitted its interim report on nuclear power to the Minister of Energy. This report was forwarded by the Minister to the Select Committee on Hydro Affairs to assist the Committee in its review of nuclear issues.

(xi) Inter-Provincial Advisory Council on Energy (IPACE) Study of Strengthened Interprovincial Electrical Interconnections

A two-volume report, entitled An Evaluation of Strengthened Interprovincial Interconnections of Electric Power Systems, together with a unanimous recommendation for a phased implementation, was submitted to the Interprovincial Advisory Council on Energy (IPACE) in October, 1978. The report was subsequently referred to the November, 1978 meeting of the Council of Provincial Energy Ministers, which authorized its public release.

(xii) Canada/U.S. Discussions on Improving the Electricity Exchange Between Countries

The Ministry took part in discussions requested by the United States to determine methods of improving the "Electricity Interchange" between countries. The discussions began in February, 1978, and a report, representing the position of the utilities in Ontario, New York and Michigan, is to be published in May, 1979.

The discussions included comments on factors which limit the increased flow of electricity across the U.S./Canada border, as follows:

1. Physical Limitations
2. Generation Mix and Fuel Availability
3. Operational Restrictions
4. Public Acceptance
5. Utility Inter-communications
6. Financial and Economic Factors
7. Political Problems

The report is to make some specific comments on opportunities for increased imports and exports as follows:

1. Firm Sales of Surplus Generation
2. Construction of CANDU - PHW Reactors in Ontario and Export of Electricity
3. North/South Diversity Exchanges
4. New Interconnections (overhead, or underwater)
5. Construction of Transmission Facilities to Eliminate Restrictions
6. More Extensive Pooling Arrangements
7. Co-ordinated Development of Generation
8. Reliance on Interconnections for Reserve

The report is to be released in Washington and in Ottawa in June, 1979.

(xiii) Hydraulic Development

On August 1, 1978, the Ministry of Energy and the Chairman of Ontario Hydro jointly announced Ontario Hydro's development of a program for the future expansion -- to 1994 -- of hydro-electric power generation. As many as 17 new projects with a combined peak capacity of 2000 MW will be involved throughout Northern Ontario. The detailed evaluation of the initial projects, leading to possible authorization by the Hydro Board, review under the Environmental Assessment Act, and Government approval, has begun.

In addition, the Ministry of Energy has supported Ontario Hydro initiatives to upgrade the capacity of existing hydraulic power installations. The Minister has also supported the Ministry of Northern Affairs in its efforts to achieve the installation of an Ontario-manufactured "Mini-Hydel" prefabricated hydraulic power station on a small hydraulic site in Northern Ontario. The station's purpose is to supply power to two nearby remote settlements, starting in the fall of 1980.

(xiv) Fusion

Support continued to furthering research in Ontario in fusion-related problem areas.

Assistance was provided to the University of Toronto Institute for Aerospace Studies towards completion and operation of an experimental facility for the study of plasma recombination.

McMaster University was given a grant for plasma-wall interaction studies in Tokamak fusion devices.

An interprovincial fusion committee of officials, chaired by Ontario, was established by the Council of Provincial Energy Ministers in December.

(xv) Nuclear Fuel Waste Management

On June 5, 1978, the Ontario and Federal Governments announced their agreement on the first phase of a long-term program to ensure the safe and permanent disposal of radioactive waste from nuclear power reactors.

This agreement resulted from discussions undertaken by the Ministry of Energy, Ontario Hydro, Atomic Energy of Canada Limited, and the Federal Department of Energy, Mines and Resources.

Prime responsibility for the program lies with the Federal Government since the Atomic Energy Control Act falls under Federal jurisdiction. The Government of Ontario, however, will be consulted at each step in the program and its prior approval will be obtained for all activities leading to a demonstration nuclear fuel waste disposal site in Ontario.

The Federal Agency, Atomic Energy of Canada Limited (AECL), will undertake research and development in the immobilization and disposal of radioactive wastes. Ontario Hydro will conduct studies on interim storage and transportation.

The program is a multi-year program and no irrevocable decisions have been made or will be made without full public discussion.

The aim of the first phase of the program is to verify the premise that permanent disposal, deep underground in a hard rock mine, is a safe, secure and desirable method of dealing with nuclear fuel waste.

A further agreement on a program leading to the selection and acquisition of a site and the subsequent demonstration of geological waste disposal will be concluded between the two Governments as quickly as possible.

There will be close co-operation and consultation between the two Governments and their agencies; a Coordinating Committee has been formed for this purpose. The Committee is composed of an AECL Chairman and representatives from the Ontario Ministry of Energy, the Federal Department of Energy, Mines and Resources, and Ontario Hydro. The Committee has met nine times during the year, and meetings will continue on a regularly scheduled basis.

B. Crude Oil

Crude oil price and supply continued to be dominant issues affecting the energy scene during 1978-79.

On August 24, 1978, the Federal Minister of Finance announced unilaterally that the domestic crude oil price increase of \$1 per barrel that had been scheduled for January 1, 1979, would not take place. In explanation, the Federal Minister cited the adverse effects such a price increase would have on employment and inflation. In an attempt to offset the effects of the \$1 per barrel July 1, 1978 price increase, the Federal Minister of Finance also announced that the 10 cents per gallon excise tax originally introduced by his predecessor would immediately be reduced to seven cents per gallon.

In the ensuing Provincial/Federal debate, Ontario took the position that while it did not favour a price increase, it stated that 'an agreement is an agreement' and should not be broken unilaterally. This position was shared by all other Provinces. Nevertheless, the Federal and Alberta Governments entered into a new agreement on December 7, 1978. Under the terms of the new agreement, no price increase was to take place on January 1, 1979, but two price increases of \$1 per barrel each were scheduled for July 1, 1979, and January 1, 1980.

Towards the end of 1978, the Iranian revolution occurred and Iranian crude oil supplies were curtailed; exports of Iranian crude oil were not resumed until March, 1979. While some OPEC countries made additional supplies available during this time, they did not make enough extra crude available to offset the total loss. The result was that the rest of the non-Communist world lost approximately five per cent of its crude oil supply. By the end of March, 1979, the International Energy Agency (IEA) had called for a voluntary five per cent reduction in demand for world crude oil by its member countries. Canada's main response was to increase domestic crude oil production.

OPEC crude oil prices had been generally stable over 1977 and 1978. However, OPEC prices rose on January 1, 1979, as the first of four increases scheduled for that year. OPEC's design was to increase its crude oil price during 1979 by an average of some 10 per cent over OPEC prices in effect on December 31, 1978. However, due to the world shortage during the first quarter of 1979 -- a consequence of the Iranian revolution -- world prices rose considerably as individual OPEC countries began to impose a series of premiums and surcharges.

Ontario believes that Canadian crude oil prices should meet the following objectives:

- they should develop additional supplies of crude oil, natural gas and, if need be, other sources of energy;
- they should protect the competitive position of Canada's industries;
- they should encourage the creation of new jobs;
- they should alleviate inflation;
- they should be equitable.

It was with these objectives in mind that Ontario proposed a blended pricing system in 1976. The Ministry continues to pursue this policy as a logical method for cushioning the impact of higher cost crude oils obtained from the most costly domestic sources and from foreign supplies.

Ontario's position regarding crude oil supplies is that a new National Oil Policy should be formulated without further delay. Its objective should be the achievement of crude oil self-sufficiency in Canada by 1995 at the latest.

On February 16, 1979, the Federal Government introduced for first reading the Energy Supplies Emergency Act, 1979 (Bill C-42). This legislation was designed to deal with oil supply interruptions and to provide the legal support for Federal oil allocation and rationing plans. The Ministry of Energy on behalf of the Province, stated that in an actual emergency, it would co-operate with the Federal Government.

The Ministry, however, did oppose the sweeping powers given to the Federal Government under Bill C-42. Bill C-42 received the Royal Assent on March 26, 1979.

Refined Petroleum Products and Petrochemicals

During the first part of the year, Ontario had a surplus refinery capacity and with it a highly competitive market environment. However, during the second half of the year, the surplus position changed, and product prices in the retail market firmed. While the Iranian revolution did not result in significant supply problems in Ontario, there were supply problems in Quebec. Therefore, during the winter, some petroleum products were transferred from Ontario to Quebec. At the end of the winter, product stocks in Ontario were considerably lower than normal.

This supply position was exacerbated by a shortage of capacity in the Interprovincial Pipe Line system, requiring deliveries of crude oil from Western Canada to Ontario to be pro-rated.

C. Natural Gas

The assurance to the consumers of Ontario of a long-term supply of natural gas at the lowest possible cost continues to be a principal objective of the Ministry of Energy.

The Ministry participated at three natural gas hearings before the National Energy Board (NEB) and at two before the Alberta Energy Resources Conservation Board. Of these hearings, the most significant was the NEB's Inquiry into the Supply and Demand for Natural Gas in Canada; the Ministry put forward a policy panel chaired by the Deputy Minister at this Inquiry.

The NEB's Report was issued in February of 1979. The Ministry endorsed the findings of the NEB, particularly the introduction of three tests to determine gas volumes considered in surplus of Canadian requirements. While these tests were not precisely in the form recommended by the Ministry, they did recognize the vital matter of deliverability stressed in the Ministry's submission and testimony.

In addition to assuring Ontario's long-term supply from conventional areas, the Ministry continues its participation in the Polar Gas Project through the Ontario Energy Corporation.

The Ministry also took part in negotiations with the Alberta Government with respect to accelerating the use of Alberta natural gas in Ontario. These negotiations are continuing.

D. Uranium

The two major uranium producers in Ontario began major production facility expansions at Elliot Lake during 1978. This was done in order to service the new long-term uranium contracts to supply Ontario Hydro's fuel needs through to 2020.

The contracts with Denison Mines and Rio Algom provide for the delivery of 76,000 tonnes of uranium to Ontario Hydro over the next 40 years. This amount will satisfy the projected fuel requirements of the utility for all existing and planned stations up to Darlington. The first deliveries from Denison Mines are scheduled for 1980.

The Federal Government requires all nuclear-powered utilities to contract for 15 years of fuel supplies. Apart from meeting these requirements, the Denison and Rio Algom contracts cover Ontario Hydro for an additional 15 years in each case. A feature of the agreements is a pricing formula which is intended to provide Ontario Hydro with uranium at a lower-than-world price.

During 1978, the Federal Government introduced two Bills related to uranium. Bill C-14, 'An Act to provide for the regulation, control and supervision of the development, production use and application of nuclear energy matters related thereto' is also known as the Nuclear Control and Administration Act (NCAA). Bill C-64, 'An Act respecting uranium and thorium mines', is concerned with foreign ownership.

These two Federal Bills were subsequently withdrawn for further amendment.

In October, the Porter Commission released an interim report on Electric Power Planning in Ontario. This report provided an evaluation of the uranium requirements for a nuclear program in this Province. The evaluation was based on the assumption that all uranium would come from Ontario mines.

The report concluded that if only measured and indicated reserves were taken into account, then Ontario would have insufficient resources to support an additional three stations. Numerous experts levelled considerable criticism at this aspect of the evaluation; they maintained that the Elliot Lake orebody is well enough defined that inferred ore could have been included in the reserve and resource estimates. In short, Ontario should have no difficulty in obtaining adequate supplies of uranium for its nuclear plants.

E. Coal and Lignite

New facilities to transport Western Canadian coal to Ontario through Thunder Bay were completed in the fall of 1978, and first shipments were delivered before winter closed the Great Lakes to shipping.

The coal facilities at Thunder Bay are designed for an ultimate annual capacity of over five million tonnes. Ontario Hydro's current coal contracts with Western producers call for the delivery of 3.5 million tonnes per year from Western Canada by the early 1980s. This system, therefore, currently has excess capacity which could be used, possibly, to move coal to Ontario steel producers. The cost of transporting Western coal to Ontario, as well as its lower relative BTU content, places it at a premium of about 30 per cent over U.S. coal. Ontario Hydro's decision to buy Western coal inspite of this premium was made because of the added security of supply this alternative source provides. As well, Western coal is low in sulphur content and is therefore environmentally attractive.

Plans to develop Ontario's only known coal deposit, the Onakawana lignite deposit near James Bay, resulted in the preparation of a preliminary feasibility study in the fall of 1978.

A private company, Onakawana Development Ltd., and Ontario Hydro are now involved in detailed engineering studies which will be finished in early 1981. The studies will determine whether or not it will be economically feasible to build a power station at Onakawana.

The Ministry of Energy commissioned a comprehensive study of coal supply and demand in Ontario during the fiscal year. The results are expected to be published during the 1979-80 fiscal year.

Coal purchases in Ontario for either utility or steel-making purposes are not expected to increase substantially over the coming decade. The current energy situation, however, has sparked renewed interest in the possibility of other potential uses and markets for coal in Ontario.

The Ministry participated in a research project at Sheridan Park to determine the feasibility of burning coal in slurry form with oil. If successful, this process would enable oil users to decrease their oil consumption.

The Province also participated in three Federal-Provincial discussions during 1978-79 with respect to Canada's part in the development of an international coal policy initiated by the International Energy Agency.

The Iranian revolution reawakened the Western world to the realization that its dependency on Arab and Third World countries for oil gravely endangers its continued economic progress. As a result, all major Western countries -- notably the U.S.A., Canada, West Germany and England -- have begun to develop synthetic fuels to reduce their dependency on imported crude oil. North America has abundant potential feedstocks, among them, tarsands, heavy oils, oil shales and coal. Trends in OPEC oil prices have brought crude oil within reach of the price per barrel that would justify the development of liquidfuels from coal. It is, however, unclear at the moment whether commensurate increases in coal prices will continue to forestall the feasibility of developing liquid fuels from coal.

Ontario currently has the largest concentration of academic and technological skill in Canada. It also has a large share of Canada's production facilities. During 1978-79, the Ministry reviewed a number of applications from Ontario universities for funding of coal-related research.



Sun House, one of four solar-heated townhouses built in Scarborough by McClintock Homes, was an outgrowth of solar expertise which McClintock gained while building Provident House, Canada's first substantially solar-heated home, in which the Ministry was involved. As with Provident House, the four townhouses have roof-mounted solar collector panels. But they collect solar heat in the form of hot air, rather than hot water.

ENERGY CONSERVATION PROGRAM

Conservation of our energy resources has been a priority for the Ministry in the years since the 1973 oil embargo. Emphasis in this area has been reflected through large increases in funding for conservation programs. In the 1978-79 fiscal year, the Ministry spent \$5.3 million on this program, up from \$4.6 million the previous year. Much of the money was reallocated to other Ministries, enabling them, with technical assistance, in many cases from the Ministry of Energy, to conduct energy projects related to their areas of expertise.

The Ministry's energy conservation projects included home insulation clinics, a program aimed at downtown building owners and managers, and studies dealing with new technologies such as district heating. The conservation programs were developed according to sectors: consumer/ residential, transportation/urban development, and commercial/ industrial.

(i) Consumer/residential

One of the major ways in which homeowners can save energy is by installing insulation and weatherproofing in their homes. During the fiscal year, the Ministry continued to explore ways to assist the public in this area. These included:

(a) a home energy audit program and (b) thermography information clinics.

The Ministry's home energy audit program involves homeowners providing information on the characteristics of their home and then receiving a detailed computer analysis of the heat loss, the costs of suggested improvements, and what their energy savings will be in dollars if the improvements are made.

Similarly, at Ministry sponsored thermography clinics, homeowners can view aerial thermograms -- "pictures" indicating heat escaping from the attics of their homes, and can receive expert advice in identifying heat loss problems and possible solutions.

To communicate information on the desirability of improved home insulation, the Ministry undertook a series of four related projects - in Lindsay, (the first thermography clinic, May, 1977), in Brockville (the first energy audit program, November 1977), in Stratford (the second thermography clinic, March, 1978) and again in Lindsay (the second energy audit program in June, 1978).

In late February, the Ministry took the thermography and energy audit concepts to Peterborough. The Peterborough project was built on experience gained in the other cities. In Lindsay and Stratford, four-day clinics had been held in a

central location. However, to accommodate the larger population of Peterborough, the project was held over a six-week period and featured neighbourhood clinics in a number of locations. The Peterborough Utilities Commission took an active role in the project, marking the first time a local utilities commission had assisted in developing such a program.

In all, thermography interpretations were done for 32 per cent of the owner-occupied dwellings in Stratford, 56 per cent in Lindsay and 37 per cent in Peterborough.

About 60 Toronto high school students attended a Government-sponsored educational workshop in August. The workshop dealt with the complexities of energy supply, demand, economics, and existing and future energy sources. The course material from this successful three-week program will likely form the basis of a professional development program for teachers.

(ii) Transportation/Urban Development

District heating -- the provision of heat from a central source to a number of buildings through a central distribution system -- is one of the technologies actively being explored by the Ministry in the urban planning area. Studies for a system to provide district heating for a community of about 20,000 people began in April, 1978. The first stage of the proposed community of North

Pickering, northwest of Oshawa, is a possible application. Other district heating studies during the year dealt with redevelopment projects in the St. Lawrence Market area of Toronto and in Sarnia. Another dealt with development of a financial model to assess investment risk. The Ministry of Energy also sponsored a seminar on district heating in June.

Improving the planning and design of new subdivisions can result in significant energy savings. In June, the Ministries of Energy and Housing announced the start of a study for a new subdivision in Guelph. The study will compare three site plans to identify energy savings associated with such factors as density, road lengths, landscaping and the direction houses face to make use of solar energy.

Other studies underway during the 1978/79 fiscal year dealt with the administrative, financial and regulatory aspects of private sector involvement in district heating. Also, energy guidelines were developed for subdivision design and waste management in the framework of the municipal planning process.

More efficient technology and better operating practices can reduce the large amounts of energy consumed in transportation. Forming a car pool or a van pool (a larger version of the car pool involving a 12-16 passenger van), is

one way to conserve transportation energy. In October, under the Ministry of Transportation and Communications' (MTC) Transportation Energy Management Program (TEMP), the Government published a Van Pool Implementation Handbook as well as a pamphlet dealing with the same subject. During the year, MTC also continued its car and van pooling demonstration projects. Other projects included testing devices and new technologies aimed at better fuel efficiency for cars and trucks, the development of an energy advisory service for commercial vehicles and municipal operations, and expanding the role of telecommunications.

(iii) Commercial/Industrial

A number of Ontario Ministries are involved in a program to improve energy consumption in Government buildings, and during the year, several reported impressive results. Energy cost savings in the correctional institutions program administered by the Ministry of Correctional Services have amounted to 25 per cent over two years. The Ministry of Colleges and Universities and the Ministry of Education both met their five-year targets, set in 1976, of 15 per cent energy savings. The Ministry of Government Services reported that in one of its office buildings, 361 University Avenue in Toronto, energy consumption was cut in half over two years, saving \$100,000 per year in energy costs.

In April 1978, Premier William Davis set the stage for co-operation between the public and private sectors. He asked owners and tenants of downtown Toronto office buildings to participate in a five-point program designed to promote wise energy use in commercial buildings. The Ministry of Energy held a seminar on this subject in March, 1979; almost 100 people attended. Twenty-nine participating companies have appointed energy co-ordinators, and are reporting substantial savings as a result of their energy conservation programs.

The Ontario Government is working, through a joint steering committee formed in October, to encourage and guide the Province's 837 municipalities in setting up voluntary energy conservation programs. The Government is working through the Municipal Liaison Committee (MLC), which has appointed the Association of Counties and Regions of Ontario (ACRO), as its delegate on the joint steering committee to work with the Ministry of Energy. During the year, the Ministry prepared and distributed a booklet, Energy Conservation Opportunities for Municipalities, and a film called Energy Conservation -- The Municipal Commitment.

The Energy Bus, a computer-equipped bus which helps industrial decision-makers analyse energy consumption and identify potential savings, was introduced in Ontario four years ago. In the fall, the province added a second, larger bus, and these buses visited a total of 375 establishments during the year, identifying \$22.5 million in energy cost reductions. The original bus was subsequently retired at the end of the fiscal year.

COMMUNICATIONS

An important part of the Conservation Program is responding to public inquiries and disseminating information on the program. During the year, the Ministry dealt with 15,000 telephone queries, 180 inquiries in person and about 4,500 letters requesting information on the Ministry's Conservation and Renewable Energy Program.

The Communications group also produced three films: A Cold Winter's Night, dealing with insulation; The Bear Facts About Energy, which presents an overview of the need for energy conservation; and Energy Conservation: The Municipal Commitment, which shows opportunities for municipalities to conserve energy. Discussion guides were prepared for the last two films. During the year, a number of technical reports were also published by the Communications group.

RENEWABLE ENERGY PROGRAM

The search for renewable energy alternatives has also become a major priority for the Ministry. This year, funding for renewable energy more than doubled to \$2.4 million, from \$1.1 million in 1977/78.

Three major areas formed the focus of this year's program: energy from waste, solar energy, and remote area power systems (wind and small-scale hydraulic systems suitable for remote areas of the province).

(i) Energy from Waste

Wood waste, municipal garbage and even sewage sludge are all potential sources of energy. Many of the projects in this area are being carried out in conjunction with the Ministry of the Environment.

A two-year study into the design and economics of a proposed energy plant at Hearst, Ontario, was completed in the fall. The plant would convert wood waste from lumber mills into steam. The study found that an estimated 129,000 oven-dried tons of wood waste is generated annually from mills in the area. An energy plant could generate 14 megawatts of electricity and produce an average of 78,000 lb./hr. of steam from the available waste. Nevertheless, the study concluded that the economics of the proposed plant would be marginal under present conditions.

The study, however, drew to the attention of the private sector the available supply of wood waste at Hearst. Shell Canada Ltd. is investigating an alternative project using the wood waste to produce wood pellets, which could be substituted for fossil fuels in industrial boilers. The Ontario Government has indicated that if Shell is unable to carry out this venture, the Province will participate in a re-examination of the energy plant and other options for use of the local wood wastes. Officials of the Ministry of Energy are continuing discussions with Shell to help the company in the assessment of its plans.

The Province is contributing up to \$500,000 for the design and economic evaluation of a proposed energy recovery plant that could burn up to one-third of Metro Toronto's garbage in the 1980s. Such a plant would also help solve Metro Toronto's pressing municipal waste disposal problems. The proposed \$80 million energy recovery plant would burn an estimated 700,000 tons of garbage a year, converting the energy recovered to steam for use in a district heating network. The amount of energy recovered would be equivalent to 750,000 barrels of oil a year.

The Ontario Government, the City of North Bay and Nordfibre company are considering another energy-from-waste project which would burn both municipal waste and wood waste. A \$50,000 study, announced early in 1979, is looking at a plant that would recover energy from garbage, sewage sludge and local wood waste. The energy would be used to produce the majority of the steam used at the local Nordfibre plant. Such a plant would save energy and money for the company, make use of energy in wood residues, and solve problems associated with the city's garbage disposal site.

(ii) Solar Energy

Canada's first solar heated school, Applewood Public School in St. Catharines, opened to over 200 students in September, 1978. In late 1978, a solar-assisted heat pump began supplying energy to meet some of the space and hot water heating requirements. The system is designed to provide three-quarters of the heating requirements. Monitoring of the system will start in the winter of 1979. This is the largest and most complex solar energy demonstration project undertaken by the Ministry of Energy to date.

A senior citizens' residence in Aylmer, the first Canadian apartment building to be substantially solar-heated, was completed during the year. Its performance is now being monitored. Other solar systems installed this year include: West Humber Collegiate in Etobicoke (which provides about half of the school's hot water needs); the Richvale Community Centre's outdoor swimming pool in Richmond Hill; four domestic hot water systems in Ontario Housing Corporation single family homes; and a package space heating system, called "a backyard solar furnace," designed to provide part of the heat for a Toronto bungalow.

Following studies carried out during the year, solar water heating systems are being installed in a new 150-unit residence at Confederation College of Applied Arts and Technology in Thunder Bay. Another system is being installed at Oakville-Trafalgar Memorial Hospital.

During the fiscal year, the Government also initiated studies dealing with application of solar energy to row housing, a correctional institution, high-rise apartments, and agriculture.

Since even the best solar collector is useless without sunlight, protection of access to the sun could therefore become a matter of concern as use of solar energy increases. In May, the Minister released a discussion paper on "Perspectives on Access to Sunlight." This paper outlined existing law on the subject and looked at a number of methods to protect solar access in Ontario.

(iii) Remote Power Systems

Part of the Ministry of Energy's Renewable Energy Program involves studying various means of providing electrical power to locations remote from the Ontario Hydro grid. The most popular power system for such locations is currently the diesel-powered generator. In some of these remote areas, however, diesel fuel may cost the user \$2 to \$3 per gallon, compared to 60 cents per gallon in the south. At this price, alternative energy sources, including wind and small-scale hydraulic systems, become competitive.

The Ministry of Energy and the National Research Council of Canada participated in a demonstration project involving a 13-metre-high, wind-assisted diesel generator. The project was set up on Toronto Island to take advantage of the consistently strong winds in that location. A study of this project, completed in early 1979, found that in areas with high annual average wind speeds, a wind turbine coupled to a diesel generator can save substantial amounts of fuel per year.

A further wind turbine demonstration is planned for Northern Ontario this coming year.

In Northern Ontario, there is still some undeveloped hydraulic capacity at several existing sites. A number of small-scale (less than 30-foot head), hydraulic turbine units have opened up a new range of applications, particularly for community power in remote areas. Demonstration of a small-scale hydraulic turbine at Wasdell Falls began during the year, and four other locations are being studied by Ontario Hydro.

(iv) Advisory Group on Synthetic Liquid Fuels

The Ministry's Advisory Group on Synthetic Liquid Fuels completed its seven-volume report. The report sets out an evaluation of the potential for production of synthetic fuels in Ontario manufactured from wood, municipal solid wastes, and non-renewable deposits of lignite coal. The report, which was released in June, suggested that it is only when the price of crude oil (and the related comparative cost of natural gas) increases to the equivalent of more than \$30 per barrel that these fuels -- methanol, ethanol or synthetic gasoline -- might be economically justified. According to the report, the most efficient ways of producing energy from such sources at present prices are direct burning and gasification, rather than converting Ontario's renewable resources into a liquid fuel.

COMMUNICATIONS

In addition to public information inquiries, discussed in the Conservation section, the Communications group revised the Ministry's successful booklet on solar energy, Turn On The Sun. This revision was undertaken after distribution of the first printing of 40,000 copies.

During the year, a number of technical reports were published in the Conservation and Renewable Energy areas. A series of displays to provide information on Renewable Energy as well as Energy Conservation programs were developed and disseminated.

ENERGY REGULATORY AFFAIRS PROGRAM

This program involves essentially the regulation of the Ontario natural gas utilities and the administration of The Ontario Energy Board Act. About one-half of the Energy Board's resources are directed to regulation; the other half are currently directed to the support of the Ministry's Conventional Energy Program, specifically the review of Ontario Hydro's electrical rates and rate structures.

Details of the Regulatory Affairs Program can be obtained by reference to the latest Annual Report of the Ontario Energy Board.

ENERGY SUPPLY PROGRAM

The Ontario Energy Corporation participated in three energy projects during 1978 - Syncrude, Polar Gas and the use of By-Product Heat. For the fiscal year ended December 31, 1978, the Corporation earned a net income of \$50.9 million. Total assets increased to \$171.9 million compared to \$100 million in 1977. This increase was due to the Corporation's sale of its interest in the Syncrude Project for \$160 million.

The Minister of Energy, the Honourable James Auld, announced to the Legislature on December 14, 1978, that the Ontario Energy Corporation had reached agreement to sell its five per cent interest in the Athabasca Tar Sands Syncrude Project to PanCanadian Petroleum Limited of Calgary.

Through its participation in the Polar Gas Project, the Ontario Energy Corporation continued to support the programs necessary to determine the feasibility of transporting natural gas by pipeline from the Arctic to southern markets. During 1978, Polar Gas began a study of a combined pipeline system linking the gas reserves in the Mackenzie Delta/Beaufort Sea with Arctic Islands reserves.

The Corporation actively promoted and invested in research design and development projects to utilize, for commercial purposes, by-product heat from nuclear power stations. The projects were aimed at greenhouses and the water used in fish farms.

Further information is provided in the 1978 Annual Report of the Ontario Energy Corporation.

THE ESTIMATES, 1978-79
MINISTRY OF ENERGY
SUMMARY

1979-80	PROGRAMS	1978-79		1977-78	
		Estimates	Actual	Estimates	Actual
\$		\$	\$	\$	\$
1,507,920	Ministry Administration	885,000	750,129	664,000	
2,263,000	Conventional Energy	2,321,000	1,385,391	1,715,000	
2,590,000	Renewable Energy	2,455,000	458,454	1,121,000	
7,187,000	Energy Conservation	5,350,000	3,074,419	4,600,000	
1,331,000	Regulatory Affairs	1,239,000	1,342,486	1,173,000	
550,000	Energy Supply	21,619,000	485,659	5,365,000	
15,428,920	Ministry Total	33,869,000	7,496,538	14,638,000	
23,920	Less Statutory Appropriations	18,000	18,000	18,000	
15,405,000	TOTAL TO BE VOTED	33,851,000	7,478,538	14,620,000	
ACCOUNTING CLASSIFICATION					
15,428,920	Total Budgetary Expenditures	12,769,000	7,350,459	9,638,000	
--	Total Disbursements	21,100,000	146,079	5,000,000	
15,428,920		33,869,000	7,496,538	14,638,000	

APPENDIX A

ONTARIO ENERGY REVIEW (OUTLOOK)

This appendix reproduces the Energy Outlook section of a forthcoming Ministry publication: Ontario Energy Review. It reviews an energy forecasting model developed by the Ministry.

In planning for the future it is possible to take either of two approaches. One approach is to select a target level of energy consumption and then force events in order to achieve that level, such as by prescribing how much energy each individual would be allowed to use. Another method, the one used in this analysis, is to forecast the growth in energy consumption, using current trends and anticipating events to identify potential future problems. Then, by taking appropriate action, it may be possible to avoid those problems.

The simplest kind of forecast merely projects the province's current energy consumption patterns forward to, say, the year 2000 to see where they are leading. However, significant changes could obviously occur in the structure of energy supply and consumer demand over the next twenty years. To take account of such possibilities, forecasters construct a model that allows certain basic assumptions about the future to be altered. They are then able to present a range of possible future consumption patterns.

The Ministry has developed a forecasting model that enables us to project energy demand over the next twenty to twenty-five years using a variety of different assumptions. The model is useful for quantifying the effect on future energy use of technological changes and socio-economic developments.

Using this forecasting model, the Ministry has developed three plausible alternative energy futures or 'cases' for the province.

Obviously no one can accurately predict future events, but the value in trying to anticipate energy supply and demand comes from the heightened awareness and greater sensitivity to the various factors interacting in and shaping the future. As a result of this greater awareness one is able to take action earlier than might otherwise have been possible.

The major assumptions made by the Ministry in all three cases are as follows:

there will be no major technological breakthroughs affecting energy use;

only policy measures that are currently implemented, or widely accepted as sure to be implemented, are considered;

no major social or political upheaval will radically change the structure and pattern of energy use;

the marketplace will continue to determine resource allocations;

consumers will actively pursue energy conservation opportunities;

alternative energy sources will make only a very small contribution to Ontario's total needs during the next twenty years;

the Ontario economy and population will develop along the lines forecast by the Ministry of Treasury and Economics.

The three cases differ only in their assumptions regarding energy price, fuel availability, energy use efficiency, and technology. They can be described as follows:

Case 1: Current Trends assumes only those energy use technologies currently in commercial application. Canadian oil prices approach world oil prices by the early 1980s and stay at world levels thereafter, increasing slowly in real terms till 2000. The different fuels become more price-competitive, but their relative positions remain unchanged.

Case 2: Low Energy Use assumes more rapidly increasing energy prices and higher levels of conservation in the later years. Natural gas, coal, and electricity prices maintain the same competitive relationship with oil as in Case 1.

Case 3: Uncertain Oil and Natural Gas Supplies reflects mounting concerns about oil and natural gas availability, leading to increasing choice of electricity, coal, and alternative energy sources, together with further adoption of new energy use technology.

A more detailed description of the different assumptions used in the three cases is presented in Figure 1.

Secondary (End Use) Consumption

In each of these three cases, projections of end use or secondary energy demand have been developed for the Residential, Commercial, Industrial, and Transportation sectors.

As before, the Residential sector includes households; the Commercial sector includes institutional, government, and privately owned commercial buildings, as well as municipal utilities; the Industrial sector includes agriculture, mining, and manufacturing; and the Transportation sector includes road, rail, air, and marine transportation of people and goods.

The energy consumed by refineries, pipelines, and electrical generating stations and that used for non-energy purposes such as plastics, lubricating oil, nylons, and so on are excluded from secondary energy consumption.

The projections of end use demand for the four sectors were developed by estimating the size and the characteristics of the future stock of buildings and energy-using machines and appliances and by estimating the differing amounts of energy each would use in the three cases.

The projections for Ontario's energy consumption, with all sectors taken together, are presented in Figure 2 by sector and in Figure 3 by fuel.

The details of secondary end use consumption for each of the four sectors are illustrated and discussed separately.

The future growth rate of secondary energy consumption by the year 2000 is expected to be lower than in the past (Figure 2). Each case shows energy consumption in the Industrial sector growing faster than in the other three sectors. The Industrial sector's share of the total expands from less than 40 per cent in 1965

and 1975 to about one-half in 2000. Transportation's share remains the same over the period at about one-quarter. The Residential and Commercial sectors' shares meanwhile decline steadily, from 22 and 14 per cent in 1975 to 16 and 10-12 per cent in 2000. The four sectors therefore maintain their current rank in terms of the amount of energy used: Industrial first, then Transportation, Residential, and finally Commercial.

Between 1965 and 1975, gas and electricity's shares of the total market increased and oil and coal's shares dropped (Figure 3). The projections show oil's decline continuing in every case, with coal and electricity increasing. In Case 3 a reduced gas share is picked up mainly by coal. By the end of the century more than two-thirds of secondary consumption of oil is for transportation.

Primary Energy Consumption

To calculate total primary energy demand, the secondary demand of the four sectors is totalled. To this sum is added the amount of energy used by the energy supply industries and that used for non-energy products. This calculation gives the total estimated demand for all primary energy used in Ontario in a particular year.

The recent growth and composition of the province's primary energy consumption are shown in Figure 4. In each case total consumption is expected to rise steadily, though it rises much more rapidly in Case 1, where the increase is 29 per cent from 1975 to 1985 and 77 per cent by the year 2000.

Each case sees a decline in the oil share to one-third by 1985, and in Case 3 to 30 per cent in 2000.

The share of natural gas parallels oil's decline, reaching 18 per cent in Case 3 in 2000.

Coal on the other hand can be seen making a mild comeback, in the last case surpassing natural gas consumption.

The most interesting pattern may be in electricity. Consumption of electricity produced from water-power remains about the same in absolute terms, though its share declines; but nuclear power's share increases from five per cent in 1975, to 15 per cent in 1985, and to as much as 22 per cent in Case 3 for the year 2000.

The fact that the growth in primary energy consumption is in all three cases projected to be lower than in the 1960s is a result of the expected slower growth of the Ontario economy and the expectation that

consumers and industry will take measures to improve the efficiency of their energy use. The projections in fact show higher growth rates in energy consumption between 1985 and 2000 than between 1975 and 1985.

Sectoral Energy Consumption

The projections of Ontario's secondary energy consumption presented previously were for all sectors taken together. They were based on more detailed projections of energy needs for each sector. For the interested reader these sectoral projections will now be briefly described. Other readers may wish to turn immediately to the next section on the prospects for supply.

Industrial Sector

Figure 5 summarizes the secondary energy consumption of the Industrial Sector.

Total consumption rose between 1965 and 1975 by 40 per cent.

In the next twenty-five years industrial energy consumption is expected to grow more slowly than in the past.

Total consumption is expected in each case to rise by 30 per cent from 1975 to 1985. By the year 2000 consumption will have nearly doubled from the 1975 level, but significant differences begin to appear between the projections. In Case 1 the rate of growth over the whole projection period is 2.8 per cent a year. In Cases 2 and 3 the rate over the whole period is 2.5 per cent a year.

This reduced consumption rate reflects primarily a slower expected rate of growth in the economy.

The impact of energy conservation in the Industrial sector is more modest than in the other sectors, in part because industry has already done much to control its energy costs.

As industry expands and as new plant replaces old, it has been assumed that new and more efficient processes are chosen. This change has a significant impact on the level of energy consumed and on fuel choice.

For example, assumptions include an increased use of thermomechanical pulping in the pulp and paper industry, a gradual phasing-out of the open hearth

furnace in favour of the basic oxygen furnace in the iron and steel industry, and increased use of electric boosters and electric furnaces for container production by the glass industry.

The contribution of different fuels to the energy consumption of this sector has changed dramatically since 1965. Between 1965 and 1975 electricity and oil's shares changed little, the former holding at 14 to 15 per cent, the latter dropping slightly from 20 to 18 per cent. In contrast, however, coal was replaced by natural gas as the source of over two-fifths of the energy supply. In absolute terms gas supplies to industry nearly tripled, while coal sank to two-thirds of its former value.

All three projections indicate that the decline in coal's share will be reversed. The shares of gas and oil will fall marginally, while those of electricity and coal will increase. In Case 3 coal moves strongly to replace oil and gas, increasing its share from 26 per cent in 1975 to 41 per cent in 2000.

The scope for substituting electricity for other fuels in the Industrial sector is limited. There are several reasons for this. Electricity is unlikely to substitute for fossil fuels to a major extent in

industries that use large quantities of steam, such as industrial chemicals, pulp and paper, and the food and beverage industry. In other industries, such as iron and steel, and smelting and refining, the use of oxygen-enriched air has significantly decreased fossil fuel consumption, reducing the urgency of seeking substitute fuels.

In addition, electricity-based technologies are often more capital-intensive and have limited capacity.

The 'other' category in the projection for 2000 includes mainly wood wastes and solar energy. The use of wood wastes by the pulp and paper industry is expected to more than double over the projection period. In Cases 2 and 3 it will account for about 0.5 per cent of industrial energy requirements by the year 2000.

The generation by industries of their own electricity, rather than buying it from Ontario Hydro, is projected to almost triple over the projection period, reaching a level of nearly 10 million megawatt hours by the year 2000 in Cases 2 and 3.

Transportation Sector

The Transportation sector is the second largest sector of energy use. In 1975 oil accounted for over 99 per cent of the energy used in transportation.

As Figure 6 shows, consumption grew at an annual rate of 5.4 per cent between 1965 and 1975. The growth rate is expected to be more moderate from 1975 to the end of the century, with total consumption increasing at an annual rate of 2.3 per cent in Case 1 and at only 1.1 per cent in Case 3. This striking difference between historical and projected growth rates is due first to the expected lower increase in passenger vehicle registrations resulting from lower population growth. In fact, the share of auto travel in total transportation energy consumption will be reduced from its current level of 53 per cent to 41 per cent in Case 1 and, because of increased efficiency and dieselization, to 37 per cent in Cases 2 and 3. Secondly, the introduction of automobile fuel economy standards leads to a reduction in the average consumption of the new auto stock by 40 per cent by the mid-1980s. In addition, substantial efficiency improvements in air travel can be expected.

If transportation fuel requirements are divided between gasoline, diesel fuel, and other products, it is noticeable that the relative shares of gasoline and diesel fuel have changed. Diesel fuel is expected to continue increasing its share. In all three cases the increased share of diesel oil is a result of growth in truck transport in the freight sector and increasing use of diesel engines in both trucks and automobiles.

Some alternative fuels such as methanol, hydrogen, and electricity for car and rail transportation will require long lead-times and high capital costs to bring them to the Ontario market. They are thus not expected to make a significant contribution to the Ontario transportation energy requirements before the year 2000.

Residential Sector

As Figure 7 shows, total energy consumption in the Residential sector rose by one-third between 1965 and 1975. Over the same period oil consumption rose only slightly in absolute terms but as a share declined from 59 to 42 per cent. Taking its place were natural gas and electricity. Coal, from three per cent of total consumption in 1965, virtually disappeared by 1975.

The projections suggest there will be very little growth in energy consumption until 1985, while a major upgrading of the current housing stock through home insulation is assumed to be taking place. After 1985, growth resumes but at lower than historical rates.

The growth rate in energy consumed over the whole outlook period is projected to be 0.7 per cent a year in Case 1 and 0.1 per cent in Case 3.

The additional conservation measures assumed in Cases 2 and 3 resulted by 2000 in reductions of 11 and 14 per cent respectively in over-all energy requirements compared to Case 1.

The historic trends observed in the fuel shares are projected to continue. Oil's share continues to decline to 29 per cent in 1985 and to 16 or 17 per cent in 2000. Some of oil's place is taken by gas, which grows to 44 per cent of total consumption in 1985 and to as much as one-half in 2000 in Case 1.

Electricity accounts for the rest, up to over one-quarter in 1985 and over one-third in Case 3 in 2000.

The decline of oil's market share is accounted for by two factors: the reduced share of space heating in total Residential energy requirements and the substitution of natural gas and electricity. The thermal assistance of heat pumps and heat recovery systems is not projected to have a significant impact in this sector (because of their cost and maintenance requirements).

In Case 3, solar energy makes a modest contribution, about one per cent of the sector's requirements. This contribution requires installation of solar water heating systems in 280,000 homes and solar heating systems in about 36,000 homes, for a total of about thirty million square feet of collectors installed by the year 2000.

Long lead times and high initial capital costs will make negligible the contribution of district heating systems before the end of the century.

Commercial Sector

Total consumption in the Commercial sector rose by three-quarters between 1965 and 1975, as can be seen in Figure 8. The largest share in 1965 was oil at 44 per cent; this proportion had dropped dramatically to only 18 per cent in 1975, an absolute decline of about one-third.

Taking its place were gas, increasing its share from 25 to 47 per cent, and electricity, up similarly from 20 to 35 per cent. Once again, coal - 11 per cent of the total in 1965 - had dropped out of sight by 1975.

The projections show very small increases in total energy consumption.

Lower economic growth, falling school enrolments, and measures to limit the growth of the government sector, as well as strong conservation action, will lead to much lower growth in energy consumption than in the past. In Case 1, a growth rate of 1.3 per cent is projected for the period 1975 - 2000; for Cases 2 and 3 the projected growth is only 0.3 per cent.

Prospects for Supply

Oil's share continues to dwindle, dropping to about one-tenth by 2000. Natural gas tends to hold its share at about two-fifths throughout. Electricity meanwhile continues to grow, surpassing gas by 1985 and reaching about one-half total consumption by 2000.

The switch from oil or natural gas to electricity in old buildings and the penetration of electricity in new buildings are expected to result from the choice of

electrically driven heat pumps in those medium-to-large office and retail buildings for which such systems are economically feasible.

However, this increased electrical penetration and a higher saturation of air cooling units are largely offset by reduced requirements for the space conditioning resulting from the introduction of conservation measures.

In Case 3, solar energy, mainly in institutional buildings, makes a modest contribution of about one per cent to the sector's energy requirements in the year 2000, a result of the installation of about 25 million square feet of collectors. As in the Residential sector, it is assumed that district heating will make very little contribution to the over-all energy requirements over the next twenty years.

The energy supply for Ontario is, if anything, even harder to forecast than provincial demand. From Figure 4 it can be seen that in the year 2000 Ontario is expected to need about 290 million barrels of crude oil, 1.1 trillion cubic feet of natural gas, 26 million tonnes of coal, 2,500 tonnes of uranium, and 40 million megawatt hours of hydro-electricity.

Except for uranium and water-power, Ontario relies on outside sources of supply for these fuels and is therefore dependent on the decisions of other governments, principally in Canada. While Ontario gets most of its petroleum requirements

from elsewhere in Canada, some parts of Canada depend on supplies from unstable world oil markets. Therefore Ontario is not totally insulated from the inherent uncertainty of international events.

It might be asked whether the uncertainties of supply are large enough to make any forecast scarcely credible. The answer must be stated in terms of alternatives and probabilities. The previous three energy demand projections are based on various supply assumptions. Uncertainties in the supply outlook thus become uncertainties in the consumption forecast. Canada and therefore Ontario face two principal supply risks in particular: international crude oil supply disruptions by major producing countries and a failure to proceed with Canadian oil sands, heavy oil, and frontier development in a timely fashion. Barring these two occurrences, the consumption projections presented earlier provide a reasonable picture of the range of alternatives likely to prevail in Ontario. These consumption forecasts therefore do not assume the occurrence of a crude oil crisis.

The following is a brief summary of where Ontario's energy supply is likely to come from.

Oil

The projections show a declining role for oil in meeting Ontario's total energy requirements.

Total Ontario oil consumption in the year 2000 has been projected at 800,000 barrels a day in Case 1 and at 625,000 barrels a day in Case 3. In the latter nearly 70 per cent is used for non-energy petrochemicals or fuels for transportation. The scope for reducing Ontario's requirements further without major technological development is therefore limited without significant government intervention.

Using an estimate of Ontario's oil requirements similar to that in Case 1, the National Energy Board recently concluded (Canadian Oil Supply and Requirements, September 1978) that Canadian production would be sufficient in the area currently supplied with Canadian oil, which includes most of Ontario, until at least 1995, the final year of its forecast. However, the Board projected that more than half of Canadian oil production would be provided from the oil sands, whose development world oil prices are expected to be high enough to justify. However, the cost of these enormous industrial undertakings is such as to require a national commitment.

The National Energy Board's projections conclude that Canada will continue to depend on sources outside North America for part of its oil supply. As world oil begins to fall short of demand, a situation expected by most experts after the mid-1980s, world oil prices will escalate rapidly, and the economies of the world could be threatened by sudden supply interruptions. In view of these uncertainties, measures to

reduce Canadian dependence on oil supplies from outside North American should be embarked upon without delay.

Natural Gas

Ontario's natural gas use to the year 2000 is projected to show an average growth rate of up to two per cent per year. Growth in sales depends closely on consumers' seeing that future supplies are reasonably secure. What, then, are the prospects for future supplies?

Alberta provides 99 per cent of Ontario's natural gas. The bulk of this supply comes from Alberta under a removal permit issued to TransCanada PipeLines and due to expire in 1994. The Alberta Energy Resources Conservation Board (AERCB) controls the quantity of gas removed from the province in the interest of Alberta's own future consumers. The AERCB's view of the potential reserves is therefore decisive in the issuance of future removal permits. Using an estimate of the province's potential of 110 trillion cubic feet (Tcf). The AERCB concluded that Alberta would be able to meet demands from the rest of Canada as well as existing export commitments up to 1988.

In a more recent review of natural gas removal applications, the AERCB has increased its estimate of the province's potential to between 130 Tcf and 140 Tcf.

The National Energy Board concluded (Canadian Natural Gas Supply and Requirements, February 1979) that Canada can meet its own natural gas demand at least until the early 1990s.

Eventually the conventional gas supply from Alberta is expected to be replaced by supplies from the Mackenzie Delta, the Beaufort Sea, the arctic islands, and other frontier areas, as well as from the gasification of coal. Explorations in the Beaufort Sea, the arctic islands, and off the coast of Labrador, for instance, promise significant new gas sources, though a great deal more work is required before evaluations can be made. Moreover, there is little doubt that substantial non-conventional natural gas supplies exist, but it is also apparent that they will be more expensive and that much time will be required to find and develop them and transport them to market. Because of the lead times required to replace the cheaper conventional natural gas supplies, it is possible that some temporary market shortages could occur.

Over-all, though, a fairly secure supply of natural gas is expected beyond the year 2000, provided that transportation facilities connecting frontier reserves are put in place in a timely manner and the domestic market is not jeopardized by the export of too much of this non-renewable resource.

Coal

The demand for metallurgical coal in Ontario is expected to increase on average at roughly three per cent a year until 2000. The longer-term demand for thermal coal is less certain and could vary widely from year to year, but if future oil and gas supplies become uncertain the demand for thermal coal would likely increase more rapidly, averaging between four and five per cent per year to the end of the century. Total coal use in Ontario could nearly double, from around 16 million tonnes at present to over 30 million tonnes by the year 2000.

This level of coal consumption would be small compared with the vast reserves of coal that exist in conventional producing areas of western Canada. Research, development, and demonstration programs are being conducted in Canada and throughout the world on coal gasification, coal liquefaction, coal to make petrochemical products, and fluidized bed combustion. Progress is being made in all these areas.

However, the present high transportation cost of moving coal from western Canada to Ontario could limit access to the largest coal reserves.

Coal nevertheless represents a fairly secure long-term energy source in Canada, and future technological development could have a very significant impact on its rate of development.

Electricity

The long-term growth in electrical energy use is expected to be lower than in the past. The committed generation-expansion program and other projects under consideration, including medium-scale hydroelectrical schemes, development of lignite coal resources in northern Ontario, joint venture industrial cogeneration schemes, new coal and nuclear units, and the like, together ensure that Ontario consumers are unlikely to experience electricity shortages in the foreseeable future.

FIGURE 1 : Ontario energy demand outlook: major assumptions

		Residential Old housing	New housing	Commercial Old stock	New stock	Industrial	Transportation
Case 1 Current Trends	Conservation	Thermal upgrading (20% savings) Heating efficiency (5% inc.)	Revised Building Code by 1980 (30% savings in heating demand)	Better house- keeping measures (up to 15% savings)	Revised Building Code by 1980 (up to 40% savings)	Federal conserva- tion goals achieved by 1985 (up to 15% savings by 1985)	U.S. car fuel ef- ficiency standards by 1985 (40% savings new cars) 35% savings aircraft
	Fuel choice	Some conversion from oil to gas	Natural gas (major share) Electricity 30%	Current market shares No conversion	Natural gas (major share) Electricity captures some of oil market	Current market shares. Coal increases in cement and lime production	Increased diesel- ization of trucks Dieselization of 7% of car fleet by 2000
Case 2 Low Energy Use	Conservation	Thermal upgrading (30% savings) Devices efficiency (10% inc.)	Revised Building Code by 1980	Increased house- keeping measures Thermal upgrading	Good housekeeping plus further re- vised standards after 1985	5% to 10% savings on top of Case 1 1990	5% savings on top of Case 1 (new cars) 50% savings aircraft 10% to 30% savings in trucking
	Fuel choice	Same as Case 1	Same as Case 1	Shift from oil to gas after 1985	Some heat pump penetration in office and retail	Same as Case 1 Increased self- generation of electricity	Higher trucking dieselization Dieselization of 25% of car fleet by 2000
Case 3 Uncertain oil and gas	Conservation	Same as Case 2	Same as Case 2	Same as Case 2	Same as Case 2	Same as Case 2	Same as Case 2
	Fuel choice	Conversion to electricity after 1985	Some active solar Electricity 50% by 2000	Some shift to electricity after 1985	Some solar and coal in institutions High heat pump saturation (office and retail)	Limited switch to electricity High coal penetration (40% by 2000) Same self-gen. as Case 2	Very low methanol gasoline blend Same dieselization as Case 2
All sectors: Basic common socioeconomic factors							
Ontario population growth rate:		1.2% per year (1976 - 2000)					
Ontario Real Gross Provincial Product growth rate:		4.8% per year (1976 - 1985)					
		3.9% per year (1986 - 2000)					

FIGURE 2 : Secondary energy demand by sector 1965-2000

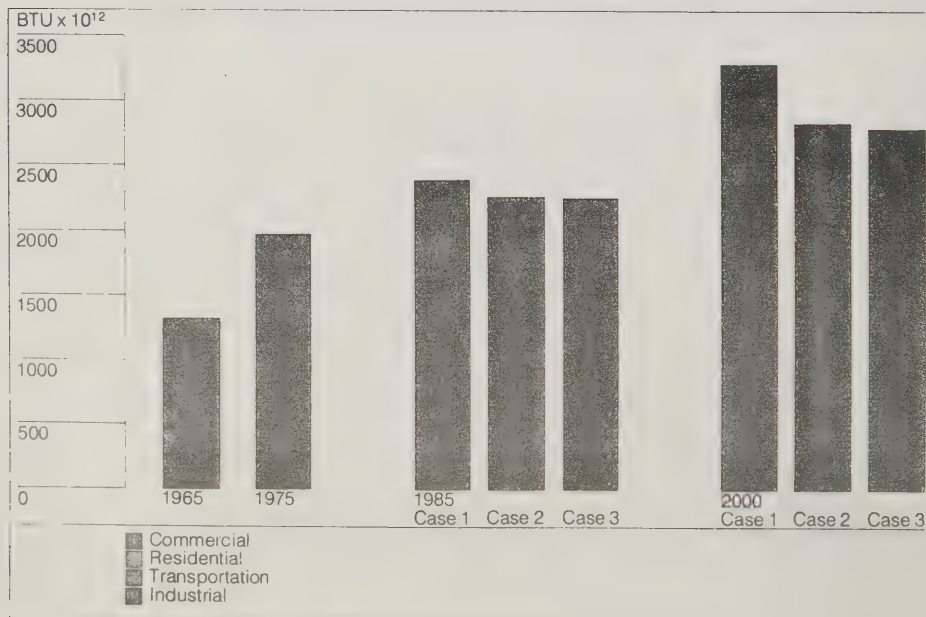


FIGURE 3: Secondary energy demand by fuels 1965-2000

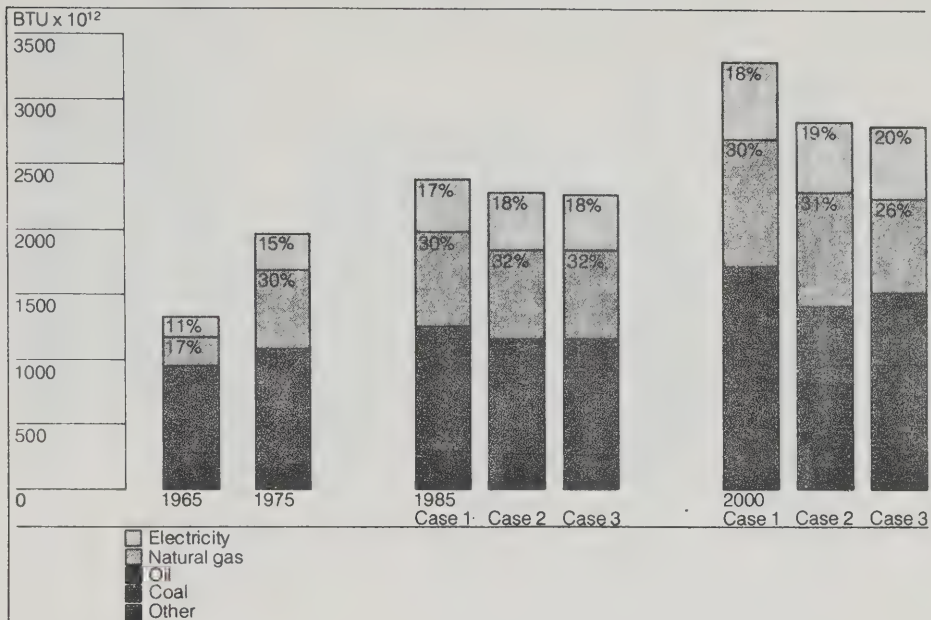


FIGURE 4 : Primary energy demand 1965-2000

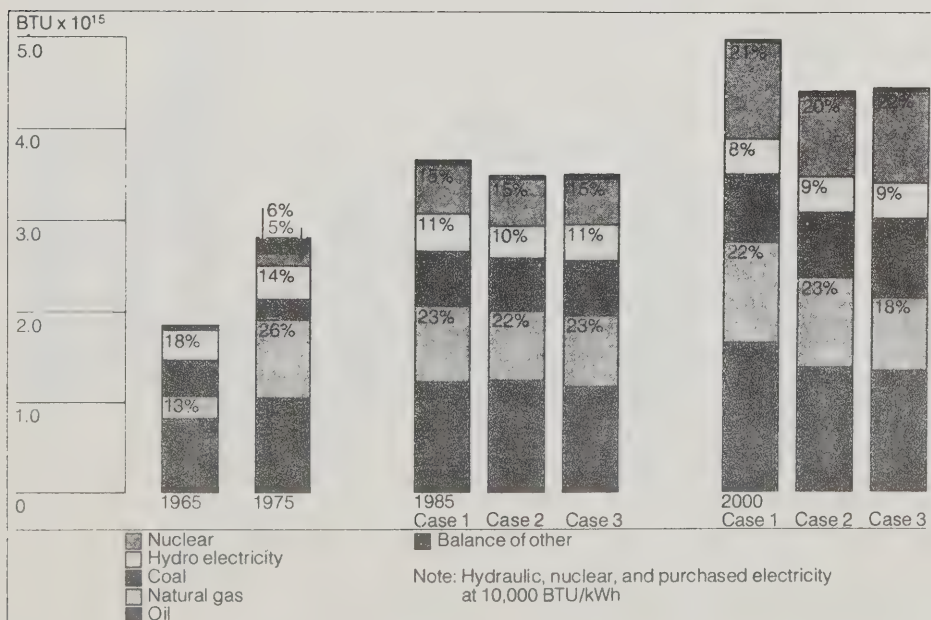


FIGURE 5 : Industrial energy demand 1965-2000

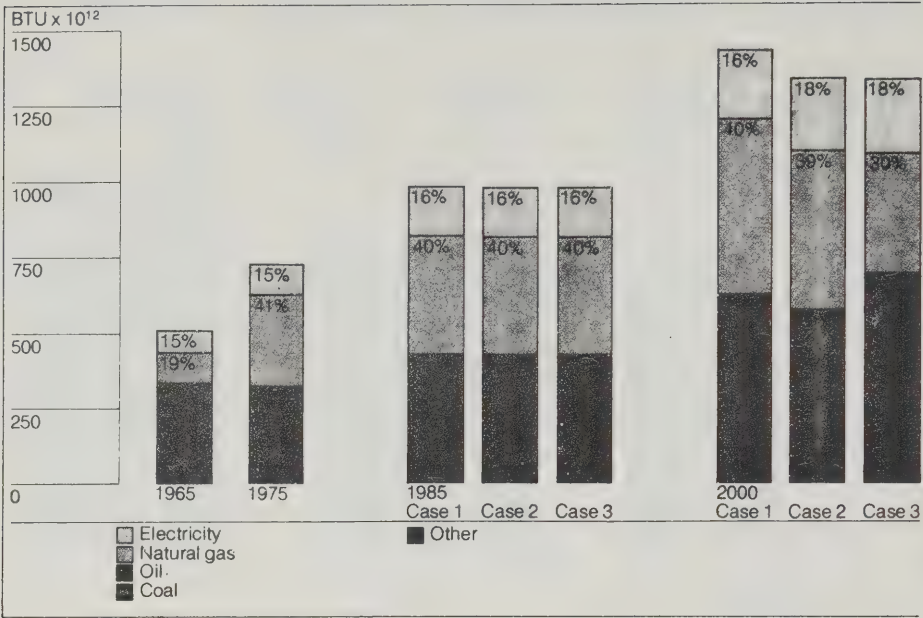


FIGURE 6 : Transportation energy demand 1965-2000

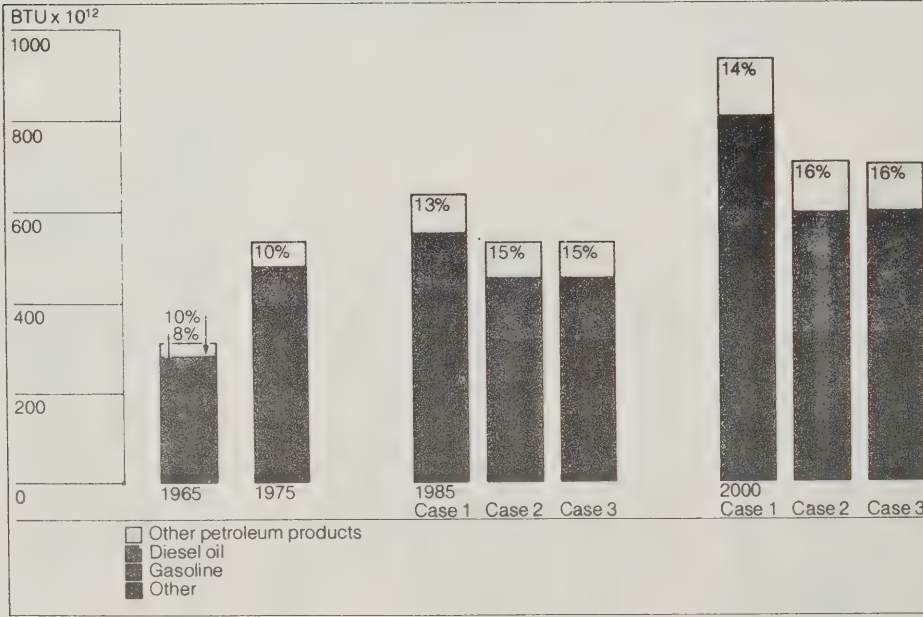


FIGURE 7: Residential energy demand 1965-2000

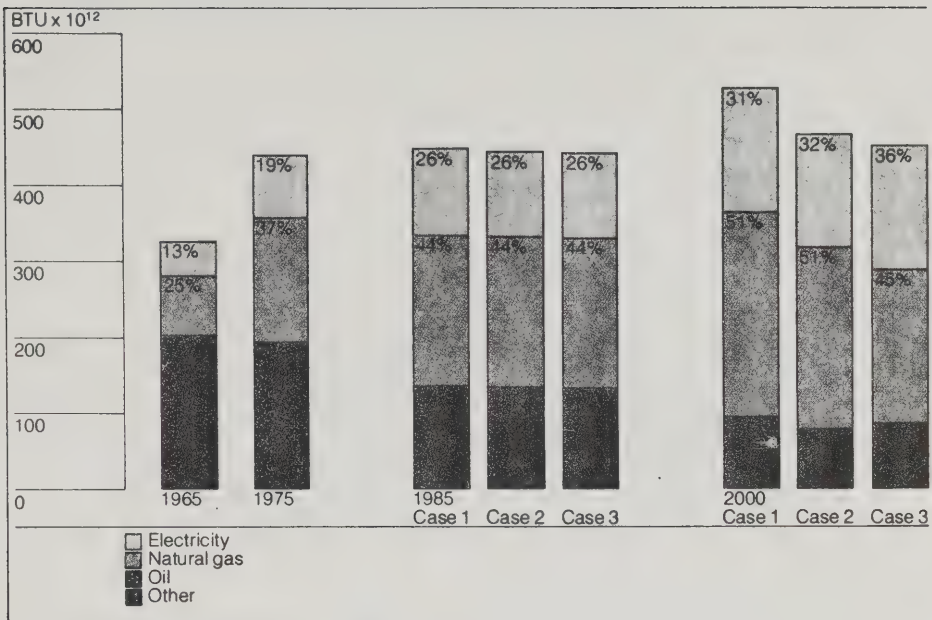
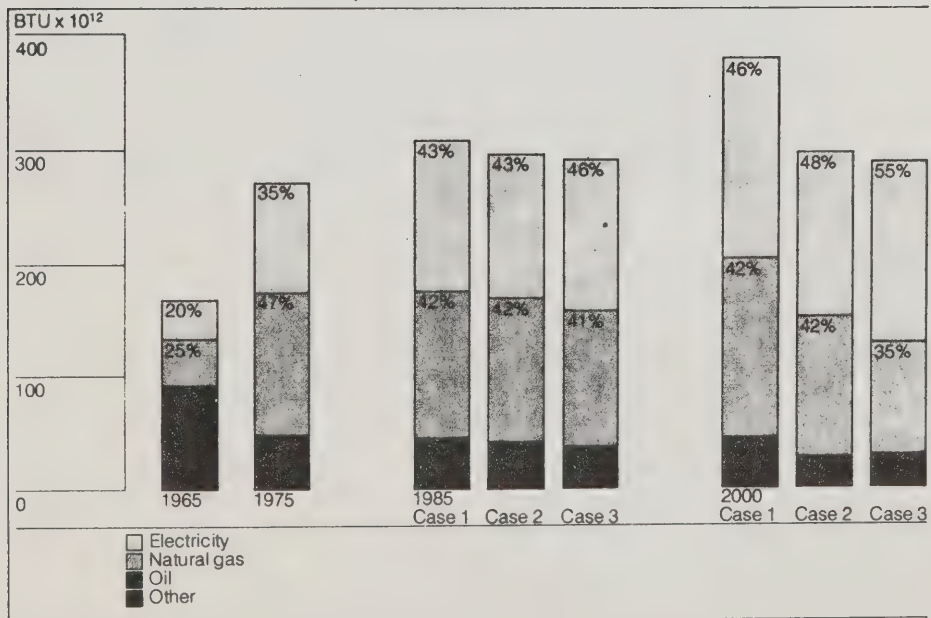


FIGURE 8: Commercial energy demand 1965-2000



APPENDIX B

CONSERVATION AND RENEWABLE ENERGY ENERGY PROJECTS

In a concerted effort to promote energy conservation and the development of renewable energy resources, the Government of Ontario is conducting more than 100 practical research and demonstration projects and public awareness programs in the fiscal year 1978-79.

This digest gives brief descriptions of those projects co-ordinated by the Ministry of Energy and carried out by 14 ministries of the Government. In addition, many ministries and Ontario Hydro are conducting a variety of projects independently.

This year \$7.8 million has been allocated to projects co-ordinated by the Ministry of Energy. An estimated \$5.3 million will be spent in the area of energy conservation, an increase from \$4.6 million in the previous year. In the renewable field, spending will more than double, increasing to \$2.4 million from \$1.1 million a year earlier.

ENERGY PROJECTS 1978-79

ENERGY CONSERVATION

RESIDENTIAL

Thermography Information Clinics

Thermography information clinics, where home-owners can view photographic representations of their houses showing heat loss detected by infrared scanners, will be held in four more communities.

Home Energy Audits

Questionnaires that help home-owners determine the loss of heat from their houses and what steps they can take to prevent it will be distributed in a number of ways.

Impact Study

Communities where thermography clinics have been held or questionnaires distributed will be surveyed to determine the extent to which these methods encourage home-owners to upgrade their houses to save fuel.

Housing Stock Survey

Housing stock in Ontario will be analyzed according to region and basic housing type. An economic assessment will be prepared of the major conservation measures best suited to each housing type.

Natural Gas Furnaces

Research is underway leading to the commercial development in the near future of a natural gas-fired furnace with a seasonal efficiency above 75 per cent for homes with forced-air circulation systems.

Natural Gas Furnaces and Water Heaters

A longer range effort -- the design, construction and laboratory testing of radically new natural gas home furnaces and water heating units to achieve maximum fuel efficiency is underway.

Oil Furnace Maintenance

Retraining courses for oil burner mechanics to enable them to perform detailed tests during annual inspections and clean-outs of home furnaces will continue. Courses instructing mechanics how to fit devices that improve efficiencies of existing furnaces will also be offered.

Conservation
Handbook

Assistance is being given the Royal Architectural Institute of Canada in the preparation of an energy conservation handbook for the Canadian construction and building management industries. The handbook will include design principles, codes and standards, and design criteria for new construction.

COMMERCIAL

Existing
Government
Buildings

Efforts to reduce energy consumption in Ontario Government operated buildings through good operating and maintenance practices are continuing. Energy audits of major office buildings are underway and modifications are being made to heating, lighting and cooling systems. The goal is to reduce energy consumption in these buildings by 15 per cent during a five year period.

New
Government
Buildings

Thermal performance guidelines for all new buildings have been established. Designs for new buildings in excess of 100,000 sq. ft. will be subjected to a computer analysis in order to minimize energy consumption requirements. Ways to incorporate renewable energy and waste heat recovery systems are being examined.

Colleges
and
Universities

A wide range of energy conservation research projects is continuing. Modifications to physical plant equipment in university and college buildings are being made with a view to reducing energy consumption. Buildings with recent modifications are being monitored to determine savings achieved.

Schools

All school boards are providing data on energy consumption in their schools. Assessment of their energy use patterns will enable the development of practical energy budgets and the establishment of priorities concerning improvements to their facilities. Curriculum guideline material on energy conservation is also being prepared for distribution to all schools.

Public
Housing

An energy consumption reporting system is being developed for buildings managed by the Ontario Housing Corporation. Opportunities for energy conservation in new and existing OHC buildings are being identified and ways to implement them developed.

Hospitals	Twenty hospital facilities throughout the province are involved in a wide range of energy conservation projects directed towards improved energy utilization. Reporting systems will be established to permit monitoring of energy consumption in all hospital buildings. Some hospitals have cut their energy costs by one-third.
Correctional Institutions	Improvements in operating and maintenance procedures are being advanced with training programs for operational staff. The goal is to achieve savings of 71 per cent this year, in addition to 25 per cent energy cost savings achieved during the past two years.
Municipalities	A program to encourage Ontario's 836 municipalities to adopt energy conservation methods is being developed with the Municipal Liaison Committee.
Downtown Buildings	An energy conservation program involving 50 large commercial enterprises in downtown Toronto is underway with emphasis on reducing night lighting in buildings.
Skating Rinks and Arenas	Three existing arenas have been examined, leading to the development of guidelines to assist owners and operators of rinks and arenas in reducing energy consumption. Design criteria for new arenas with a view to minimizing their energy consumption are also being developed.
Bulk Metering	Guidelines for alternatives to bulk metering in commercial and multi-unit residential buildings are being formulated for use by developers and municipal utilities.

INDUSTRIAL

Energy Bus	Two computer-equipped buses will visit 500 firms this year to assist in on-the-spot analysis of energy consumption and identification of potential savings. The range of programs available will be expanded to cover commercial and institutional sites as well as industrial firms.
------------	---

Greenhouses	Research into soil warming methods and greenhouse designs is being conducted with the aim of increasing crop yields without increasing energy consumption.
Farming	The feasibility of reducing energy consumption in farming through improved and reduced tillage operations is being investigated. An economic and energy analysis of various reduced tillage operations is underway.
Utilization of Waste Heat	Proposals for commercial developments to make use of waste heat from cooling water from Ontario's nuclear power stations are being investigated. Tapping the waste heat supply for greenhouses or fish farming operations at the Bruce Nuclear Power Development or Pickering are among the possibilities under review with private investors.

TRANSPORTATION

Fuel Efficiency	A number of technological methods of achieving higher fuel efficiencies in cars and trucks are being investigated.
Car Pooling	A guidebook to car and van pooling is being developed and van pooling demonstrations will be conducted in co-operation with municipalities and industries.
Street Lighting	Information based on a two-year feasibility study on ways to update existing street lights with energy efficient lighting units will be made available.

URBAN DEVELOPMENT

District Heating for North Pickering	A preliminary engineering study is underway for a system to provide district heating for a community of about 20,000, such as the first stage of the proposed community of North Pickering.
District Heating Institutional Factors	A study is underway examining administrative regulatory and financial aspects of private sector involvement in future district heating projects.
Private Sector Development	A study is underway identifying major areas of opportunity for energy conservation in private sector residential and commercial developments. Innovative energy conserving design concepts are being evaluated.

Subdivision Design	Plans for a subdivision in Guelph are being examined together with modified plans altering density, road lengths and the direction buildings face to determine the potential for energy savings through subdivision design.
Planning Guidelines	The development of energy guidelines in the framework of the municipal planning process is underway.
Urban Redevelopment	A study is in progress determining the potential energy and dollar savings that can be achieved through energy conserving designs in urban redevelopment projects.

PUBLIC INFORMATION

Conservation in Agriculture	An information program is underway using news media, agricultural and community groups, exhibits, fairs, and newsletters to bring to the attention of farmers opportunities for saving energy in farm operations.
Summer Workshop	About 60 City of Toronto Grade 12 students were given a three-week course on energy supply and demand questions, energy conservation and the development of renewable energy resources. The students will conduct energy projects in 30 schools this year.
Pamphlet Series	Work is underway on two sets of information pamphlets. One will provide basic facts on renewable energy resources -- solar, wind and biomass. The other will suggest why energy conservation is necessary, how it will benefit the individual, offer practical tips and an awareness quiz.
Audio-Visual Materials	Existing displays for fairs and exhibits and a slide collection for group presentations are being up-dated. A 10-minute film on energy conservation for use in schools and community group meetings is being completed and a film discussion guide is being prepared.
Technical Reports	Reports of studies conducted by consultants on specific energy conservation or renewable energy projects are printed and made publicly available through the Ontario Government Bookstore.

Media
Relations

Information on specific projects is made available to the news media through news releases, background information sheets, telephone contacts, responses to inquiries and requests for interviews.

Public
Inquiries

Trained staff provide information and advice to individuals by telephone and letters on matters of home insulation, solar energy and wind power. An average of 1,800 requests a month are received and answered.

RENEWABLE ENERGY RESOURCES

SOLAR ENERGY

Row Housing	Solar space heating will be tested in a row housing development. Working drawings are being prepared for a 24-unit row housing complex proposed for the town of Stoney Creek, southeast of Hamilton.
Senior Citizens Housing	Space and hot water solar heating systems at the Alymer Senior Citizens Residence will be monitored for performance.
High-Rise Buildings	Solar preheating of domestic hot water in a residential high-rise development will be tested in an existing Ontario Housing Corporation 50-to-100 unit building.
Single Family Homes	Solar preheating of domestic hot water will be tested in four Ontario Housing Corporation homes. A packaged solar space heating system will also be tested in an existing OHC house.
Schools	A solar-assisted heat pump system at Applewood Public School, a new elementary school in St. Catharines, and a solar water heating system at West Humber Collegiate Institute in the Toronto Borough of Etobicoke will be monitored.
Community Colleges	A solar system to preheat hot water is being installed at Confederation College in Thunder Bay. The system will be monitored.
Correctional Institutions	A feasibility study for solar water heating at the Brampton Correctional Institution has been completed and design work started.
Hospitals	A solar energy system to preheat domestic hot water is being installed at the Oakville-Trafalgar Memorial Hospital in Oakville. The system will be monitored.
Provincial Parks	Designs for solar heating of hot water in provincial park comfort stations will be prepared. A feasibility study of solar heating for a provincial park office will be prepared.

Community Swimming Pools	A solar heating system for an outdoor swimming pool will be tested at the Richvale Community Centre pool in Richmond Hill. Working drawings for a solar system for an indoor swimming pool in Hamilton will be prepared.
Black Creek Village Visitors Centre	An energy-conserving design has been prepared for the proposed Black Creek Pioneer Village Visitors Centre. The potential for including solar water heating features is being investigated.
Access to Sunlight	A discussion paper outlining existing law on solar rights and examining a number of possible legal methods to protect solar access in Ontario has been issued. Public response is invited.
Passive Solar Energy Study	Design information, with illustrative examples, is being prepared to include passive solar heating in future projects.
Shading Study	A study will be undertaken on the development of a system to characterize and rationalize shading that can affect the performance of solar energy systems and restrict their use in urban areas.
Design and Sizing Aid	A 30-page design aid is being developed to help the layman to estimate the size, performance and cost of various solar systems for new and existing buildings.
Impact Model	An analytical tool and procedural method is being developed to examine the potential market penetration of solar energy systems to predict the contribution these systems might make towards Ontario's total energy requirements.
Builders' Guide	A guide for builders is being prepared in co-operation with the Housing and Urban Development Association of Canada on the incorporation of energy conservation techniques and passive solar energy designs in new residential construction.
Greenhouses	A solar-heated greenhouse will be constructed and monitored in New Liskeard.
Animal Buildings	The application of solar heating to other farm buildings will be tested in a swine rearing building and through demonstration of the application of solar collectors to existing barn designs.

Industrial
Applications

A study will be undertaken to identify industrial heating needs and the types of solar energy systems that can meet them.

Water
Heater
Testing

A test laboratory will be established to assist manufacturers in developing solar water heating products and to provide information leading to the development of standards.

WIND ENERGY

Wind/Diesel
Generator

Modifications will be made to the design of a wind/diesel generator constructed on the Toronto Island, further tests carried out and an improved version constructed in Sudbury during 1979.

BIOMASS

Municipal
Solid
Waste

The Regional Municipality of Peel is being assisted in determining the feasibility of an energy-from-waste plant to supply steam and/or electricity to a large industrial plant.

Sewage
Sludge

A sewage sludge pyrolysis unit is also being tested at the Environment Canada Centre for Inland Waterways in Hamilton.

Energy Recovery
from Incinerator
Gases

A preliminary study is underway to assess the feasibility of the recovery of energy in the form of steam and/or electricity from the Commissioners Street Incinerator in Toronto. A second project is leading to the recovery of heat in an incinerator in the Town of Lindsay.

Liquid Fuel
from Wood

Research is being conducted into the production of a liquid fuel by direct hydrogenation of poplar wood fibres at elevated temperatures and pressures.

Hearst
Wood Waste
Energy Plant

Investigations are continuing into the construction of a plant to make use of waste from lumber mills and municipal waste in the Town of Hearst.

Energy Plant

The location in Northern Ontario of a demonstration plant for conversion of wood wastes into energy (steam and/or electricity) is being explored.

Animal
Wastes

The production of methane gas from animal wastes on a farm scale will be demonstrated at the Arkell Swine Research Centre.

For further information, write or call:

Information Office
Ministry of Energy
Conservation and Renewable Energy Group
56 Wellesley Street W.
Toronto, Ontario
M7A 2B7

Telephone: (416) 965-3246

The following is a list of some Ontario Government energy conservation and renewable energy projects and activities conducted independently of the Ministry of Energy.

Ministry of Agriculture and Food

Energy conservation in greenhouse flower production through environmental control is being examined at the University of Guelph. Researchers there are also preparing a theoretical design of an energy self-sufficient farm.

Ministry of Colleges and Universities

In the community colleges, a variety of energy conservation measures are being implemented to reduce energy consumption at specific locations. These include:

- installing storm windows, replacing single-glazed windows with double-glazed units, and closing off 2,000 sq. ft. of windows.
- increasing the capacity of building control systems
- introducing a computerized utility control system

In the universities, a number of renovation and repair projects incorporate energy saving measures (improving insulation while replacing a roof) although none are exclusively energy conservation projects.

Ministry of Community and Social Services

Energy conservation in Homes for the Aged and Senior Citizens Centres is being encouraged through directives and energy bus visits. Rehabilitation workshops and children's mental health centres are among the other funded institutions requesting advice on conservation measures.

Ministry of Consumer and Commercial Relations

A review of energy conservation measures in building codes is continuing.

Ministry of Correctional Services

Exhaust fan timers, energy saving lights and shower heads that use less hot water are being installed in correctional institutions.

Ministry of Education

The Ministry continues to encourage energy conservation programs in the 160 school boards throughout the province.

Ministry of the Environment

In the Watts from Waste program, work is proceeding towards the construction of a resource recovery facility in Etobicoke and the conversion of furnaces at Ontario Hydro's Lakeview Generating Station. The Ontario Centre for Resource Recovery was officially opened August 1 in Downsview where refuse derived fuel is being stockpiled for use by a cement company in Woodstock. A preliminary study is underway to determine the feasibility of a resource recovery plant in Thorold.

Ministry of Government Services

Energy conservation features and solar energy technology are being incorporated in government buildings under construction this year. The Newmarket Courthouse will use solar space and hot water heating, an office building in Sudbury will use recoverable energy for heating with solar energy supplementing space and hot water heating, and Centralia College will incorporate a heat pump for space heating and solar energy for hot water heating.

Ministry of Housing

Assistance in the monitoring of a solar domestic hot water system installed by Consumers' Gas Co. is being given the Ontario Research Foundation.

Ministry of Industry and Tourism

Studies examining the market potential for heat pumps, incentives for industrial energy conservation, and programs for energy conservation training are planned. Seminars and trade missions will explore solar collector marketing, solar technology in the U.S., solar assistance programs, and insulating and building materials. Advertisements, brochures and an idea award program are among the promotion methods planned.

Ministry of Natural Resources

At the Angus Seed Plant near Barrie, seeds are extracted from cones, the waste cones are burned to produce steam and generate electricity and the recovered energy is used in the plant, reducing consumption of conventional fuel.

Ministry of Transportation and Communications

Ways to reduce gasoline consumption are being explored in such areas as:

- the use of methanol/gasoline mixtures and diesel fuels,

- the testing of design features to reduce excess consumption in cold weather,
- the promotion of maintenance actions that save fuel;
- the testing of fuel efficient lubricants and tires.
- the conversion of commercial vehicle fleets to diesel engines.

Ontario Hydro

Ontario Hydro is active in a number of areas including:

- promoting the wise use of electrical energy through an advertising campaign
- working with the Ministry of the Environment and Metro Toronto in the Watts from Waste program,
- encouraging the efficient use of electrical energy in the home by assisting in the development of improved appliances.
- assisting smaller retail stores in shopping centres with more efficient interior and display lighting methods
- training more than 200 conservation surveyors from Hydro and municipal utilities to conduct walk-through surveys of some 12,000 small to medium industrial plants in the province.
- initiating conservation seminars and an award program.

Additional copies of this report and other reports of the Ministry of Energy may be obtained from:

In Person

Ontario Government Bookstore
880 Bay Street
Toronto, Ontario

By Mail

Ontario Government Publication Service
880 Bay Street, 5th floor
Toronto, Ontario
M7A 1N8



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Year Ended March 31st, 1980



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416/965-2041
Telex 06217880

July, 1980

TO THE HONOURABLE PAULINE M. McGIBBON
O.C., B.A., LL.D., D.U. (OTT)

Lieutenant-Governor of the Province of Ontario

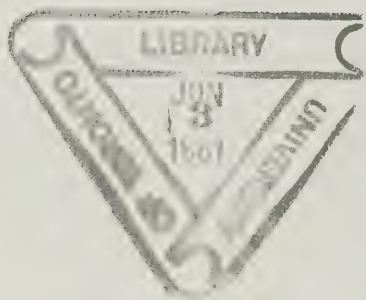
MAY IT PLEASE YOUR HONOUR:

I take pleasure in submitting the Seventh Annual
Report of the Ministry of Energy for the fiscal year ended
March 31, 1980.

Respectfully submitted

A handwritten signature in cursive script that reads "Robert Welch".

Robert Welch
Minister of Energy





Energy
Ontario

Deputy Minister

Ministry
of
Energy

Queen's Park
Toronto, Ontario
M7A 2B7
416/965-4565
Telex 06217880

July, 1980

TO THE HONOURABLE ROBERT WELCH, Q.C.
Minister of Energy, Ontario

Sir:

I have the honour to present the Seventh Annual
Report of the Ministry of Energy for the fiscal year ended
March 31, 1980.

Respectfully submitted

Malcolm Rowan

Malcolm Rowan
Deputy Minister

Honourable Robert Welch, Deputy Premier and Minister of Energy, talks with Doug Darling, Energy Consultant in the Energy Projects Group of the Ministry of Industry and Tourism. The Energy Bus regularly visits plants and businesses to advise on conservation measures. The bus has an on-board computer to assist in analyzing the efficiency of energy used in a plant or building. The Energy Bus program has been very successful.



MINISTRY OF ENERGY ANNUAL REPORT



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ENERGY ONTARIO

Energy Ontario is a new identification adopted by the Government to keep Ontario citizens informed and aware of the Government's energy efforts.

In Ontario today, oil accounts for 41 per cent of our primary energy needs, yet we produce little of our own.

Canada itself imports over 20 per cent of its oil from other countries, at a time when there is instability and uncertainty about the continuity and security of foreign oil supply.

For these reasons, energy awareness and involvement are needed both within Government and with the public. That is why the Ministry of Energy adopted Energy Ontario as a symbol to assist in creating this awareness. It allows instant recognition of energy activities across Government. In fact, some 250 energy projects have been brought together under the Energy Ontario symbol.

Through Energy Ontario, the Provincial Government is exploring new horizons in the field of energy. We are looking at ways that more plentiful and secure forms of energy, such as electricity, natural gas, coal and propane can be substituted for crude oil.

As well, many of our Energy Ontario Programs concentrate on the development of alternative forms of energy such as energy from waste, solar, wood and biomass.

Most importantly, Energy Ontario will be used to promote energy conservation, both within Government and with the public.



Energy Ontario

In Government, the energy consumption in buildings was reduced by more than 15 per cent over a two year period. Through Energy Ontario, further targets for energy cutbacks will be set for Government buildings and vehicles.

Similarly Energy Ontario will be used to encourage the public to adopt good conservation behaviours in the home, on the road and on the job.

The Ontario Government is committed to increasing Ontario's capacity to produce more of its own energy and to reduce the provincial demand for energy. Energy Ontario is the symbol of that commitment. Co-ordinated by the Ministry of Energy, Energy Ontario represents the co-operative efforts of Ministries throughout Government working for Ontario's energy security.

DEPUTY MINISTER'S SUMMARY

Energy Supply And Price

Ontario's Response

Ontario's Energy Security

Conservation and Reduced Energy Growth

"Zero Crude Growth" by 1985

Initiatives to Achieve "Zero Crude Growth"



Ontario's traditional energy supplies -- particularly crude oil -- are less secure and/or their price rapidly increasing. The following sets out the context and scope of the efforts now underway to increase Ontario's capacity to produce more of its own energy and to consume less.

Energy Supply and Price

Security of crude oil supply is Canada's number one energy problem today.

This country cannot presently produce enough crude oil to meet its needs from domestic resources, at a time when foreign crude oil supplies are increasingly expensive and their continued availability cannot be guaranteed.

Today, Canada imports close to 20 per cent of its crude oil supplies. By 1990, unless vigorous steps are taken, it is projected that Canada will need to import about 40 per cent of its requirements.

Given its dependence on foreign crude oil and the prospect that it could be cut off from world supplies for political and other reasons, Canada's oil supply is increasingly vulnerable.

Apart from Canada's increasing crude oil supply vulnerability, a vulnerability which Ontario shares, the present pricing policies of the Federal Government with respect to crude oil and natural gas likewise adversely affect Ontario.

Canada's supplies of natural gas, coal and electricity, however, are secure for the foreseeable future.

Ontario's Response

Ontario has responded to the national crude oil supply deficit and the federal crude oil and natural gas pricing policies in two ways.

First, it has participated actively in the national debate on crude oil supply and

pricing and has set out the following policy position:

- a crude oil self-sufficiency program should involve:
 - increasing crude oil supply, mainly through oil sands and heavy oil production, enhanced recovery, frontier and offshore resources;
 - reducing oil requirements by substitution of other fuels; for example, natural gas, electricity, coal, energy from waste materials and renewables; and
 - reducing crude oil consumption through conservation;
- a national plan for crude oil self-sufficiency by 1995 should be established;
- world price for crude oil should not be used as a benchmark for pricing Canadian oil;
- there is a need for a national petroleum company.

In large part, Ontario's crude oil supply and pricing principles have been accepted by the Federal Government as the basis for negotiation with the producing provinces.

Second, Ontario has announced an energy policy framework for the next 15 years which involves:

- Ontario's ability to meet more of its own energy needs;
- Ontario's ability to use less petroleum.

Of particular interest is Ontario's response to the need to increase its capacity to meet more of its own energy needs.

End Use Energy In Ontario by Type and Sector in 1979

(N.B. These figures are an estimate. Final 1979 figures are not yet available.)

Resource	% By Type	% By Sector			
		Residential	Commercial	Industrial	Transport
Petroleum Products	45	37	24	18	100
Natural Gas	30	39	44	41	0
Electricity	16	23	32	16	0
Coal & Other	9	1	0	25	0
Total	100	100	100	100	100

Ontario produced 22.6 per cent of its primary energy needs in 1978, 12.7 per cent of which was from renewable energy (water). In other words, Ontario must purchase from other jurisdictions almost 80 per cent of its energy needs.

This Province has little conventional energy - crude oil, natural gas, or coal. However, it does have uranium which, when converted into electricity, produced almost 10 per cent of Ontario's primary energy in 1978.

The policy goal has been set to increase, over the next 15 years, Ontario's capacity for energy self-sufficiency by 55 per cent. This will mean a significant acceleration in investment in renewable and recoverable energy.

In total, the goal is to increase Ontario's energy self-sufficiency from 22 per cent to 35 per cent by 1995.

Ontario is committed to a major effort to increase the province's capacity for

energy self-sufficiency as a means of contributing to a reduction in its crude oil requirements. Accordingly:

- by 1995, Ontario will supply at a minimum 35 per cent of its energy from sources within the Province;
- by 1995, at least 15 per cent of Ontario's primary energy will be from renewable and recoverable resources;
- to achieve its 35 per cent target, a public and private investment of some \$30 billion (in 1979 dollars) will be needed over 15 years -- of which more than half will be needed for renewable energy alone. This investment could come from a variety of sources, including the private sector, individual property owners, Ontario Hydro,



municipalities and the Ontario Government. A key Ontario Government role will be in 'seed' funding and pilot project investment, through a variety of means;

- the Ministry of Energy will establish a renewable energy development organization, in cooperation with the private sector and Ontario Hydro;
- Ontario will seek participation from the private sector, particularly the petroleum industry, and Ontario Hydro in financing the capital and operating expenses of the renewable energy development organization;
- the Ministry of Energy, assisted by the Ministry of Industry and Tourism and by the Ministry of Treasury and Economics, will develop the financial and other conditions to foster a solar energy equipment industry as well as other renewable energy industries in Ontario;
- the Ministry of Energy will expedite the establishment of a viable Energy from Waste

recovery industry based on:

- . municipal solid waste,
- . forest waste,
- . agricultural waste,
- . industrial waste;
- Ontario Hydro will be encouraged to accelerate its own program, in cooperation with the Ministry of Energy, to increase Ontario's capacity for energy self-sufficiency with particular reference to energy efficiency, hydraulic power, use of lignite, solar energy, cogeneration, by-product power and conservation;
- Ontario is accelerating its "Future Energy Sources Audit" to determine the size of Ontario's water, coal, peat, forest and forest waste resources and their potential for contributing to Ontario's future energy supply;
- Ontario reaffirms its commitment to the safe and careful use of nuclear power to ensure a secure supply of electrical energy.

Conservation and Reduced Energy Growth

Contribution to Ontario's energy needs from indigenous energy sources-1978-1995

Goal: To increase Ontario's energy self-sufficiency from 22 per cent to 35 per cent by 1995.

Primary Energy Requirements¹

Ontario	1978 %	1995 ² %
Conventional		
1. crude oil	0.1	*
2. natural gas	0.2	*
3. coal/peat	0.0	1
4. uranium	9.6	19 ³
Renewable		
1. water	12.7	10
2. energy from waste		
MSW	*	
forest	*	
industrial by-product heat	*	
synthetic liquid fuels from agricultural waste	0.0	
3. solar	0.0	5**
4. wind	0.0	
5. wood		
direct burning	*	
conversion to liquid fuel/gas	0.0	
6. fusion	0.0	0
7. hydrogen	0.0	0
Percentage of Ontario's primary energy requirements	22.6	35

¹Ontario provides 22.6% of requirements after adjusting for exports

²Goal

³Based on existing construction commitments

*minor contribution

**minimum goal

This chart reproduced from Energy Security for the 80's (September, 1979).

Prior to 1973, the demand in Ontario for energy -- petroleum products, natural gas, coal and electricity -- grew by more than five per cent per year.

Today, Ontario's total energy demand is growing at a more modest 2.5 per cent per year. While programs to conserve all forms of energy will continue, special emphasis is being given to conserving petroleum products. Ontario consumers, both at home and at work have reduced their rate of growth in demand for energy by half since 1973.

Since 1973, energy conservation programs have been initiated in the following areas:

- residential - private home;
- commercial - office buildings, stores;
- industrial - energy bus;
- transportation - transportation energy management program;
- urban development, urban design, building codes, planning research and development.

Targets have been set to reduce the growth rate for all forms of energy to no more than two per cent and to achieve zero per capita growth in the demand for petroleum by 1985 without sacrificing economic growth.



An effective crude oil conservation strategy must address the petroleum requirements of all sectors. The transportation sector is particularly important because of the large amount of petroleum products consumed and also because most vehicles cannot readily use other types of energy. Key factors in transportation are:

- about 50 per cent of petroleum consumption occurs in the transportation sector with the major portion (35 per cent) by private automobile;
- there is not enough practical technology at present to enable transportation vehicles to use other types of fuels on a wide scale basis;
- the private car remains the dominant and much preferred method of personal transportation. In many rural and northern areas of the Province there is no other option;
- the vulnerability of the transportation sector, as evidenced by the recent energy problems in the United States and the lineups at gasoline stations and the nationwide truck strike arising from the cost and availability of diesel fuel;
- the trend to smaller motor vehicles represents one major area of success in U.S. policy although the change has not been occurring at a sufficiently rapid pace. Smaller vehicles could reduce Canadian consumption of petroleum in 1985 by the equivalent of one oil sands plant (worth about \$5 billion);
- the potential for successful conservation initiatives in the transportation sector is great (e.g., the shift to public transit, a shift to rail from automobile and air in intercity transportation, vehicle maintenance, driving within the speed limits, and the transition to newer and hence more fuel-efficient vehicles).

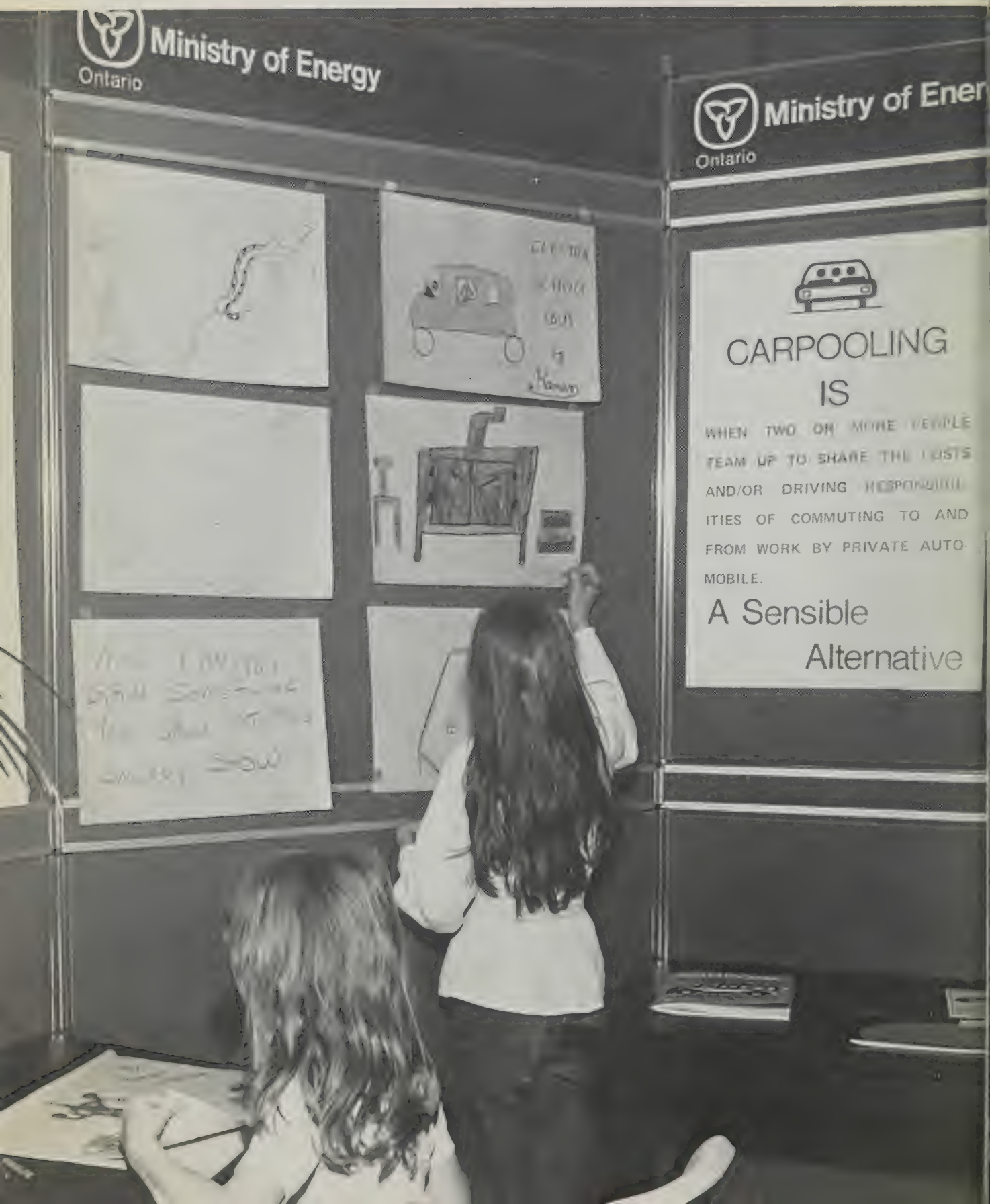
Initiatives to Achieve "Zero Crude Growth"

Specific initiatives could include:

- further improvements to public transit (since 1973 almost \$900 million has been invested by the Province in capital and operations in public transit systems);
- promotion of public transit;
- improved insulation in residential, commercial and industrial buildings;
- improved furnace efficiency and waste heat recovery;
- conversion of buildings and industry where appropriate from oil heat to natural gas or other fuels such as solid waste;
- improved truck transportation efficiencies;
- promotion of a shift to rail from automobile and air intercity transportation;
- promotion of district heating;
- an expanded role for electricity;
- increased emphasis on van and car pooling;
- higher priority to changes to urban design and transportation systems which affect energy consumption;
- improved urban amenities to reduce the desire to travel;

Initiatives in all of these areas are now underway.

In October, 1979, the Ministry of Energy participated in the Energy Lifestyle Show at Toronto's International Centre. The Ministry exhibit, which invited children to express their ideas about saving energy, was displayed in various centres across the Province throughout the year.



HIGHLIGHTS OF MINISTRY ACTIVITIES



Listed below are some highlights of the policies and programs initiated during the past year by the Ministry of Energy.

Policy

1. The Government in the publication Energy Security for the Eighties: A Policy for Ontario established the following energy targets:
 - a. By 1995, Ontario will supply, at a minimum, 35 per cent of its energy from sources within the Province, a 55 per cent increase;
 - b. By 1995, at least 15 per cent of Ontario's primary energy will be produced from renewable sources;
 - c. By 1985, the growth rate in the demand for all energy will be reduced to no more than two per cent and to zero per cent per capita growth for petroleum.
2. Ontario Energy Corporation (OEC) was reorganized and subsidiary corporations established in the following areas:
 - a. Energy resources;
 - b. Alternate energy;
 - c. Power sharing;
 - d. Energy in transportation.

Energy Conservation

1. A five year \$4.9-million "Heat Save" Conservation Program, designed to improve home energy efficiency, covering 60 major communities and 42 per cent of Ontario's population was initiated, as well as "Heat Save" clinics that were held in Kingston, St. Catharines and Cornwall.
2. A Builders' Guide to Energy Efficiency in New Housing, a comprehensive energy conservation guide, was developed exclusively for builders of homes to assist them in designing and constructing energy efficient homes.
3. A five year \$58-million Canada/Ontario Energy Conservation Demonstration Agreement was signed with the Federal Government to facilitate the development and demonstration of energy conservation technology.
4. Ontario municipalities received assistance in their efforts to save energy and tax dollars through the establishment of a joint Ministry of Energy and Association of Counties and Regions of Ontario committee.
5. The potential for district heating in downtown Sarnia was examined in a report prepared by consultants.
6. The Bruce AgriPark Joint Venture involving the Ontario Energy Corporation (OEC) and five private partners was established to use the waste heat from the Bruce nuclear plant in agricultural and aquacultural projects.
7. A Downtown Toronto Energy Conservation Program in major commercial buildings resulted in energy savings of 22 per cent.
8. A \$3.4-million investment instituting conservation measures in Government buildings resulted in over \$7-million savings and over 15 per cent energy savings in just two years. Final figures for the fiscal year 1979-80 are not yet available but it is expected that they will add significantly to previous savings.
9. A \$4.7-million Voluntary Energy Conservation Communications program was established to encourage the public to save energy in transportation and at home.

Highlights (continued)

10. "Energy Ontario", an energy conservation and renewable energy program involving over 15 ministries and agencies of the Ontario Government, was designed to provide focus for more than 250 energy projects now underway.
11. Seminars for municipal planners held in five cities -- Thunder Bay, London, Ottawa, Sudbury and Toronto -- to introduce energy planning policies.
12. Tax exemptions involved removing the seven per cent Provincial retail sales tax on specified energy conserving materials and equipment in the Ontario Budget.
5. Canada's first solar heated school, Applewood Public School, opened in St. Catharines at a cost of \$845,000.
6. Over 25 solar energy projects were established including four domestic hot water heating systems located in Ontario Housing Corporation single family homes; a solar system in West Humber Collegiate in Etobicoke; a solar hot water system at the Oakville-Trafalgar Memorial Hospital; and the solar heating system for the swimming pool at Richvale Community Centre.

Conventional Energy

Renewable Energy

1. A 15-year \$3-billion Energy from Waste Program for Ontario was established.
-- 12 municipal waste projects which could produce electricity or steam are already under evaluation with a total estimated cost between \$317-million and \$433-million, involving up to 2.2-million tonnes of municipal garbage annually. This would be the equivalent of about 2.5-million barrels of oil annually.
2. A Synthetic Liquid Fuel/Alternative Fuel Task Force was established to assess the role which other fuels can play in substituting for petroleum.
3. The \$809,000 Aylmer Senior Citizens apartment building opened with 30 solar-heated units.
4. A 1-year methanol and wood energy feasibility study in Eastern Ontario was launched to examine the possibilities of locating a facility to produce methanol or other forms of renewable energy.
1. The Federal Government adopted, in general, Ontario's crude oil and natural gas pricing and supply principles as the basis for developing a national crude oil and natural gas pricing policy.
2. The Legislature passed legislation restructuring the public utility commissions in the regions of Niagara, Halton, and Durham.
3. The Ontario Energy Corporation initiated and financially assisted a nuclear process steam survey in Bruce County to assess which industries might be located in a proposed industrial park near the Bruce nuclear plant.
4. Heavy fuel oil upgrading discussions held with the refining industry with the result that heavy fuel oil upgrading projects have been announced which will result in a more efficient use of the crude oil that Ontario refiners purchase.
5. A Hydrogen Task Force was established to assess the role which hydrogen can play in Ontario's energy future.



Publications

1. Ontario Energy Review, July 1979, \$2.00
2. Subdivisions and Sun, September 1979, \$4.00
3. Energy Security for the Eighties: A Policy for Ontario, September, 1979, FREE (also available in French)
4. Conservation Gazette, October 1979, FREE
5. Wind Turbine Diesel Hybrid, November 1979, \$3.00
6. New Directions in Municipal Energy Conservation: The California Experience, January 1980, \$3.00
7. Builders' Guide to Energy Efficiency in New Housing, January 1980, \$6.00
8. Residential Passive Solar Heating: Review and Development of Design Aids, February 1980, \$4.00
9. Energy from Waste: A Program for Ontario, March 1980, \$2.00

The above publications are available in person at the Ontario Government Bookstore (Main floor), 880 Bay Street, Toronto or by mail at the Ontario Government Publications Service (Fifth floor), 880 Bay Street, Toronto, Ontario, M5S 1Z8. Cheques or money orders should be made payable to the Treasurer of Ontario.

Pickering Generating Station -- A vacuum building, easily distinguishable at the left of the photo, is part of the containment system serving to protect against the escape of radioactive materials. Hydro's nuclear installations offer defense-in-depth against possible accidents, and a Legislature Select Committee learned Ontario's nuclear reactors are among the safest in the world.

Photo courtesy of Ontario Hydro



CONVENTIONAL ENERGY PROGRAM

Crude Oil



This program is responsible for conventional energy policy development for:

- A. Crude Oil
- B. Natural Gas
- C. Electricity
- D. Lignite and Coal
- E. Uranium

The following considerations are implicit in the objectives of this program:

- to review energy matters on a continuing basis, particularly as they relate to supply, demand and transport of conventional energy resources;
- to ensure adequacy and security of conventional energy supplies at fair and reasonable prices and with acceptable environmental impact;
- to advise the Government on matters of conventional energy and related policy;
- to represent the Government's policy position and protect its interests before Federal and Provincial regulatory authorities;
- to co-ordinate the conventional energy-related activities of the Government, including policy direction to Ontario Hydro and technical support to the Ontario Energy Board.

During the year, the Ministry has taken the following conventional energy policy initiatives:

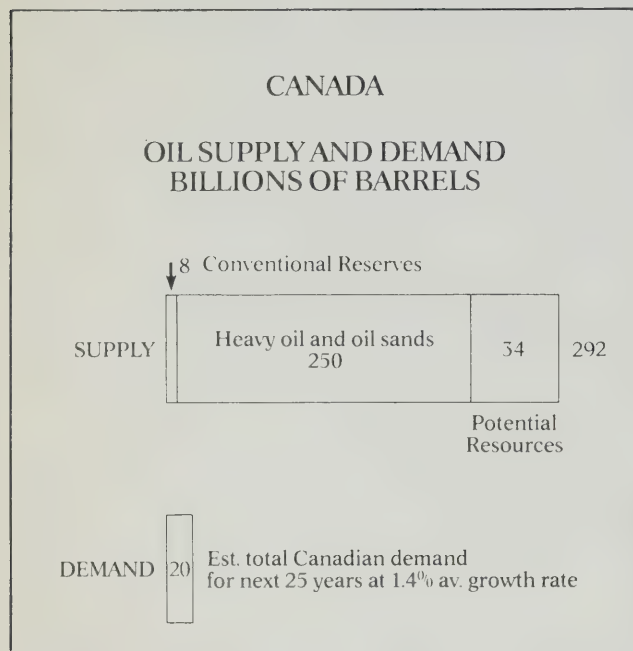
A. Crude Oil, Petroleum Products and Petrochemicals

The effects of the Iranian revolution were felt throughout 1979. Demand for oil on the international market continued to be strong as consuming countries rebuilt inventories drawn down in the early part of the year. OPEC production was up by 3.3% from 1978 despite the fact that Iran contributed only about half of its pre-revolution volume of five million barrels per day.

During 1979, the International Energy Agency requested its member countries to reduce their oil consumption by five per cent. Consumption figures for the year are not yet available. It appears, however, that some western countries -- particularly the U.S.A. -- have been successful in their efforts to reduce consumption. Others are reported to be making strong efforts to curtail demand.

The world price of oil rose sharply during the review period. The official selling price of the Saudi Arabian marker crude was U.S. \$26.00 per barrel. Many of the other OPEC countries established premium prices and surcharges.

Canada's main response to the International Energy Agency's call to reduce demand for world crude oil was to increase domestic production. The increased production in Western Canada was to offset a reduction in imports, rebuild inventories and meet current demand. This "cushion" of additional production, however, turned out to be only about half of the volume that had been anticipated. Since the importing companies were not anxious to import additional volumes of high-priced foreign crude under the Oil Import Compensation Program, product inventories in Canada fell below desirable levels for a large part of the year. As the winter of 1979/1980 came to an end, however, inventories improved markedly. This was mainly due to ad hoc purchases by the oil industry and a mild winter.



Source: "Oil and Natural Gas Resources of Canada"
Energy Mines and Resources, Canada

Preliminary figures show that demand in Ontario for main products in total was slightly down in 1979 from 1978. There was, however, a sizeable increase of about 3.8 per cent in demand for motor gasoline. (The national demand for gasoline increased, on the average, by about three per cent.)

During the period of low inventories, prices for petroleum products firmed significantly. When the inventory situation improved during the first quarter of 1980, price increases tended to temper. Business in the petrochemicals industry was good during fiscal 1979/80. This was mainly due to export market opportunities.

While foreign oil prices continued to rise sharply, prices for Canadian crude rose by one dollar per barrel on July 1st, 1979 and again on January 1st, 1980. The effects of these increases were passed on to consumers 60 days later. As stipulated in the December 7th, 1978 agreement between the Federal and Alberta Governments, these increases were the only price changes for fiscal 1979/80.

As of March, 1980 the average cost of Alberta crude delivered to Toronto refiners was approximately CDN \$16.65. The average imported barrel of foreign crude at Montreal cost approximately CDN \$32.00.

Ontario's policy in respect to domestic crude oil pricing has been stated on many occasions. Briefly, Ontario believes that pricing policy should meet the following objectives:

- it should lead to the development of additional supplies of crude oil, natural gas and, if need be, other energy resources;
- it should protect the competitive position of Canadian industry;
- it should encourage the creation of new jobs;
- it should not exacerbate inflation;
- it should be equitable.

The new Federal Government has adopted the principle of the blended pricing system for crude oil which Ontario had proposed as far back as 1976. It will apparently use this system as a basis for negotiating crude oil pricing with the Alberta Government.

The Ontario Government's target for Canadian crude oil self-sufficiency by 1995 has largely been adopted as the conventional wisdom. There are, however, some differences in opinion as to target date.

During the year, the Ontario Ministry of Energy continued to assist the Federal Government in the preparation of federal contingency plans designed to cope with an oil shortage. At the same time the Ministry pressed the Federal Government to improve its state of operational readiness to deal with such an eventuality.



B. Natural Gas

During the past year, the number of homeowners converting to natural gas from heating oil more than doubled compared to the previous year (from 9,000 in 78/79 to 20,000 in 79/80). We expect that this trend will continue. The principal reasons for this increase are the competitive price of natural gas and security of supply. The Ministry of Energy endorses this action by homeowners and continues to pursue the objective of secure natural gas supply at the lowest possible cost.

The Ministry played an extensive role in the Natural Gas Omnibus Hearing of the National Energy Board (NEB). There were two parts to the hearing. The first phase dealt with several applications to export gas to the United States. The second phase examined an application to extend the natural gas transmission system east to Quebec and the Maritime Provinces.

The Ministry participated in the first phase of the hearing by drawing out, through cross-examination, some of the more important advantages and disadvantages of the various proposals before the Board. This action helped the NEB to complete the public record. The Ministry's greatest concern was that the matter of additional natural gas exports was being considered alone rather than in an overall context of all energy forms.

In the second phase, the Ministry once again conducted cross examinations. Its aim was to determine the source of the various subsidies which are likely to be required to extend the natural gas system to Quebec City and the Maritimes.

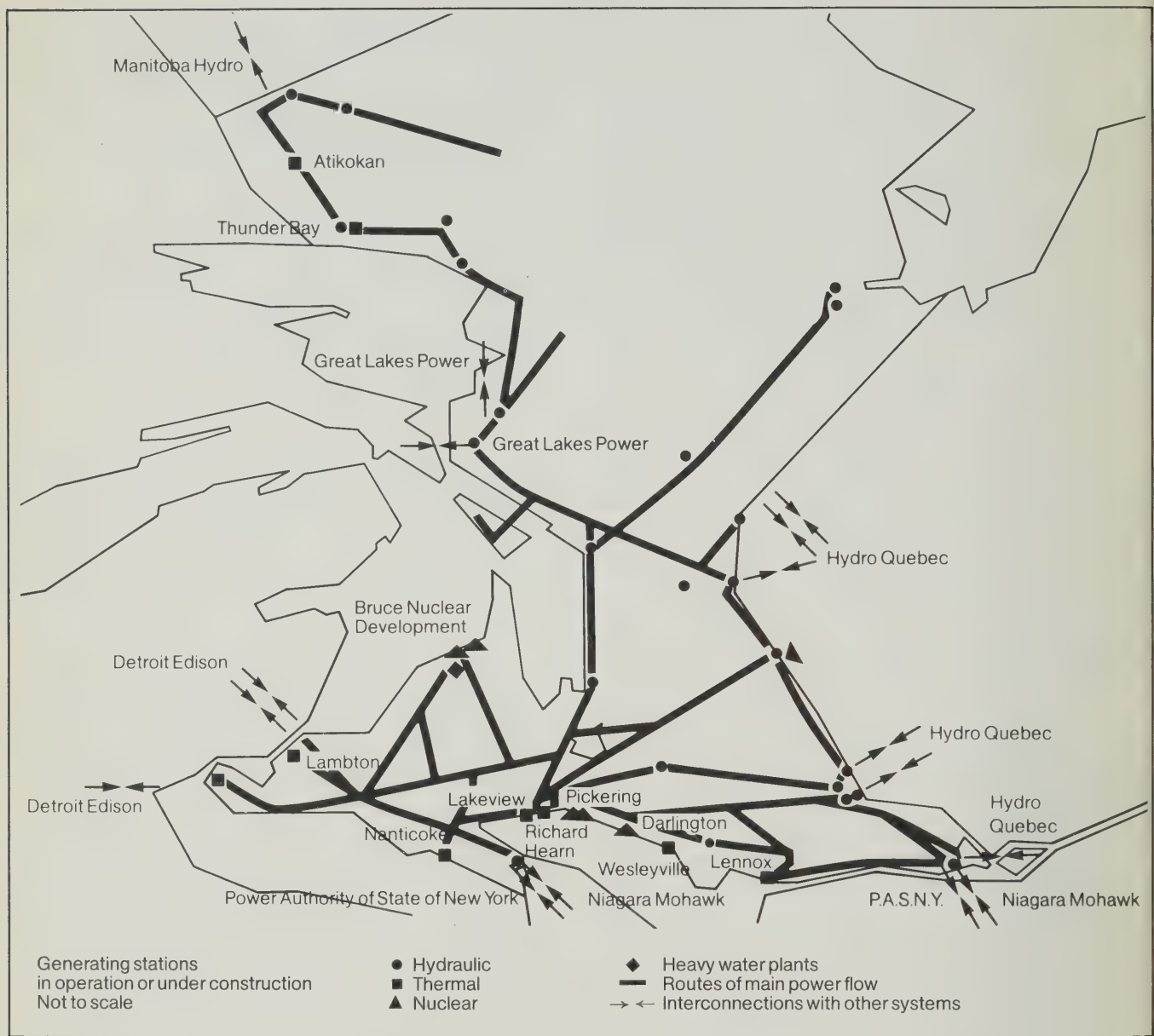
The Ministry supports the concept that no part of Canada should be denied the advantages of secure, reasonably priced energy. It also believes that all energy options should be examined before a natural gas line is approved beyond Quebec City.

The Ministry of Energy also intervened at two other natural gas pipeline facilities hearings. The object of these interventions was to assure that concerns regarding the environment and land use in Ontario were brought to the attention of the National Energy Board.

In addition to assuring Ontario's long-term supply of natural gas from the conventional areas, the Ministry continued its participation in the Polar Gas Project through the Ontario Energy Corporation.

The Ministry also took part in negotiations with the Alberta Government aimed at accelerating the use of Alberta natural gas in Ontario by means of a Natural Gas Incentive Program. These negotiations are continuing.

Ontario Hydro System



Water-power, coal and uranium each contribute to the production of about one-third of Ontario's electricity. This means that about two-thirds of the Province's electricity is produced from Ontario-based resources: water-power and uranium.



C. Electricity

(i) Rates and Charges (Bulk Power Rates) of Ontario Hydro for 1980

On April 30, 1979, the Chairman of Ontario Hydro submitted a proposal to the Minister of Energy to increase 1980 bulk power rates to municipal hydro utilities and direct industrial customers. The proposal was referred to the Ontario Energy Board (OEB) for review in accordance with Section 37A of the Ontario Energy Board Act. In his letter to the Energy Board, the Minister requested the Board to report on the extent to which Ontario Hydro had kept its proposed bulk power cost increase for 1980 as low as possible, consistent with the maintenance of its financial soundness, its ability to attract capital at favourable rates and the reliability and quality of its service to its customers.

In its proposal, Ontario Hydro sought to raise bulk power rates to municipal utilities by an average of 9.9 per cent and to increase rates to direct industrial customers by an average of 7.8 per cent.

Following 14 days of public hearings, the Ontario Energy Board submitted a report recommending a rate increase lower than that proposed by Ontario Hydro. Ontario Hydro's Board of Directors announced the new rates in October and the rate increases -- which averaged 8.3 per cent -- were implemented as of January 1, 1980. Bulk power rates to municipal utilities were increased by an average 8.67 per cent. Bulk power rates to industrial customers were increased by an average 7.1 per cent. With the ending of anti-inflation rebates applied in the previous year, the effective increases were 16.4 per cent to municipal utilities and 14.8 per cent to direct industrial customers.

(ii) Ontario Energy Board Report on Principles for Electricity Costing and Pricing

During 1979/80, the Ontario Energy Board completed its hearings into electricity costing and pricing principles appropriate for use by Ontario Hydro. This issue had been referred to the Energy Board by the Minister of Energy in February, 1977. The OEB began its hearings in March, 1977, and concluded the fifth and final phase in June, 1979. On December 20, 1979, the Ontario Energy Board submitted its final report on electricity costing and pricing principles to the Minister of Energy. The report is being reviewed by Ontario Hydro, and Hydro has announced a program of consultation with its customers prior to implementation of changes. The Ministry of Energy is also coordinating review of the report within the Government.

(iii) Load Forecast and Construction Program

In April 1979, the Ontario Hydro Board announced its decision to stretch out the completion schedule of several generating stations then under construction. This decision was made in view of the fact that the 1979 forecast of load growth was less than the forecast had been in 1978. During 1979, Ontario Hydro also decided to take advantage of a surplus in required generating capacity to mothball some of the higher cost, fossil-fired units.

In January 1980, the Hydro Board approved a new long-term load growth forecast. This forecast predicted an average annual rate of growth of 3.4 per cent between now and the year 2000. Hydro management was instructed to assess the implications of this new forecast for the construction schedules of the generating stations. On March 10, 1980, the Hydro Board decided to stretch

out the construction schedule for the Darlington nuclear generating stations by an additional 18 months. No changes were made in the construction schedules of other stations.

(iv) Project Approval

As part of his responsibility for Ontario Hydro, the Minister of Energy makes recommendations to Cabinet concerning Ontario Hydro's expansion plans. Each project requires final approval by the Lieutenant-Governor-in-Council. During the past year, the following projects have passed through this procedure:

- construction of low voltage substation and distribution lines in the following areas:

Westminister, - Substation and
Yarmouth Townships Distribution Line

Trafalgar Township - Distribution Line

Ramsay Township - Substation

Enniskillen, - Substation and
Brooke, Plymouth Distribution Line
Townships

Sandwich West - Substation
Township

Jaffery Township - Substation

Thorold Township - Distribution Line

(v) Expropriations Approvals

During the year, the Minister of Energy approved the expropriation of land for the following Ontario Hydro Projects:

OH-69 Beaverton Junction to Lindsay
 Transformer Station (230 kV);
 April, 1979;

OH-73 Thunder Bay Generating Station to
Port Arthur Birch Transformer
Station (115 kV); January 8, 1980

Claireville Transformer Station to
Highway No. 48; February, 1980.

(vi) Municipal Hydro Restructuring

The major restructuring of local government in the early 1970s and the establishment of many new municipal boundaries created the need to examine the restructuring of the jurisdictions of retail electrical distribution authorities.

In 1973, Mr. William Hogg of Sault Ste. Marie, was appointed Chairman of a Committee to report on and make recommendations for municipal hydro restructuring for both regions and restructured counties. In February, 1975, The Hogg Report, amended, was tabled in the Legislature and adopted as a guideline for local study groups. At the same time, a provincial Steering Committee on Municipal Hydro Restructuring was set up to coordinate the local studies in accordance with the provincial guidelines. In addition, the Committee was to provide an organization for reviewing and implementing these local studies.

Since that time, restructuring studies have been initiated in ten regions and counties. Legislation has been enacted for the following Regional Municipalities: Waterloo and Peel (July, 1977); the County of Oxford (December, 1977); York (June, 1978); Niagara (May, 1979); and Halton and Durham (June, 1979). The restructuring legislation to date has provided for the transfer of over 78,000 rural customers (approximately ten per cent of the total number of Ontario Hydro's rural customers) to municipal utilities.



At the end of the fiscal year, restructuring legislation for the Regional Municipalities of Hamilton-Wentworth, Sudbury and Ottawa-Carleton was introduced in the Legislature. The new municipal hydro commissions will commence their operations on or before January 1, 1981.

The Provincial Steering Committee for the Restructuring of Municipal Utilities was dissolved at the end of December, 1978 as its work had been essentially completed.

(vii) Northern Electrification

Electric power is made available to certain Northern Ontario communities not currently served by the Ontario Hydro transmission system. This is done under the aegis of the Ontario Government's Program for the Electrification of Remote Northern Communities. This \$3 million program was announced on December 15, 1976. Under its terms, the Province provides Ontario Hydro with capital funds for local diesel generation, small hydraulic generation, or extensions to existing transmission lines.

Facilities in Hillsport, Oba, Armstrong, and Biscotasing are now on line.

Ontario Hydro has entered into an agreement with the Ministry of Northern Affairs to install a 150 kW lowhead turbine generator at Sultan. Auden may be eligible for service in 1980, depending on the outcome of a survey of the number of customers.

(viii) Methods of Electrical Metering

As indicated in the Annual Report for the year ending March 31, 1978, a Tri-Party Committee investigated the energy and dollar benefits and disadvantages of banning bulk metering in Ontario for newly constructed multiple-unit residential dwellings.

The Tri-Party Committee was composed of representatives from Ontario Hydro, the Ontario Municipal Electric Association and the Association of Municipal Electric Utilities. After the Committee completed more than a year of study, its final report was tabled in the Legislature on December 15, 1977.

Copies of the report were sent to a number of groups and individuals for comment. Responses have been received from most interested organizations and these have been reviewed by Ministry staff.

It is expected that policy recommendations will be brought forward to Cabinet in 1980. These recommendations will be based on an analysis of the Committee's recommendations as well as the reaction of the various interested groups and the public.

(ix) Nuclear Fuel Waste Management

On June 5, 1978, the Governments of Canada and Ontario announced agreement on a long-term program for nuclear fuel waste management. Under this agreement, the Ministry of Energy participates as a member of the Canada/Ontario Coordinating Committee. Atomic Energy of Canada Ltd. (AECL), is responsible for research and development of methods of disposal of nuclear fuel wastes.

During the year, the Ministry approved public information programs on most regions of the Ontario portion of the Canadian Shield. These programs are conducted by AECL.

Following an invitation from the Atikokan Township Council, specific approval was given by Ontario, through the Coordinating Committee, for AECL to begin test drilling at a site outside Atikokan in Northwestern Ontario. Work began in the fall of 1979 and was resumed in the spring of 1980 when weather

permitted. During 1979, research on holes that had been drilled previously at White Lake in Eastern Ontario also began.

The purpose of AECL's work at Atikokan and White Lake is to provide information on the properties of granite rock at a depth of 500-1000 metres. This information will be used in assessing the feasibility of disposing nuclear fuel wastes deep within hard rock formations. Research drilling at other locations in Ontario is likely to proceed over the next year or two.

A site for a demonstration waste disposal facility is not expected to begin for at least three years.

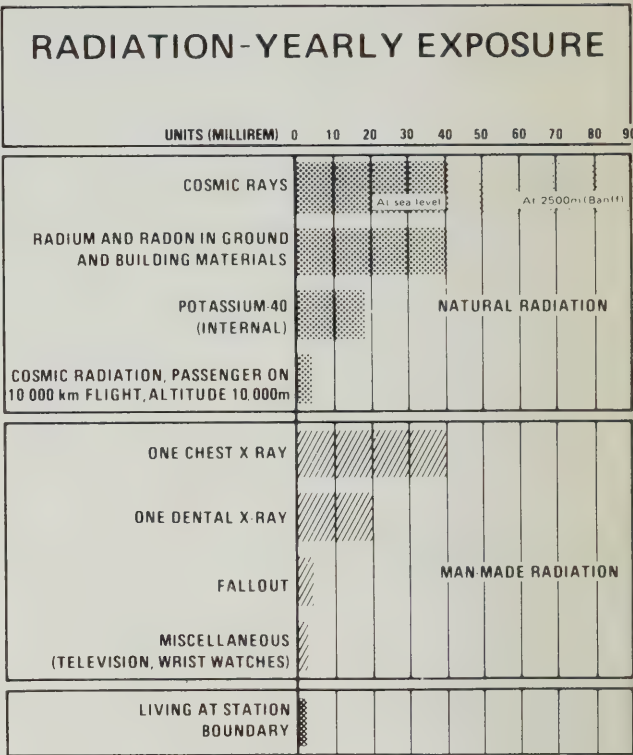
(x) Select Committee on Ontario Hydro Affairs

In the wake of the March, 1979 accident at the Three Mile Island nuclear plant near Harrisburg, Pennsylvania, the Select Committee held thirteen weeks of hearings on the safety of Ontario's nuclear power plants. These hearings took place between April and October of 1979.

The Minister of Energy appeared before the Select Committee on August 15, 1979. He responded to questions relating to the safety of a 20 mW(e) nuclear demonstration plant at Rolphton, Ontario.

In December, 1979, the Committee issued an Interim Report on the Safety of Ontario's Nuclear Reactors. In preparation for finalizing the report later in the year, a further two weeks of hearings were held in March 1980.

In January and February 1979, the Committee held extensive hearings on the demand for electricity. A final report was not prepared at that time.



At the request of the Committee, a "Special Report on the Need for Electrical Capacity" was prepared and tabled in the Legislature in December, 1979.

The Committee also held six weeks of hearings on nuclear fuel waste management between January and March of 1980.

On January 8, 1980, the Deputy Minister of Energy made a presentation to the Committee on the Canada/Ontario Nuclear Fuel Waste Management Program. On February 6, and February 7, 1980, he responded to questions by the Committee at two further hearings. On March 13, 1980, the Minister of Energy responded to questions by the Committee on Ontario's involvement in the program.



(xi) Royal Commission on Electric Power Planning (R.C.E.P.P.) and its Implications for System Expansion Program

RCEPP concluded its hearings early in the fiscal year. In June, 1979, it issued a report on the need for bulk power facilities in Southwestern Ontario. In July, 1979, a report was issued for Eastern Ontario.

On the basis of the RCEPP's report for Eastern Ontario, the Government authorized Ontario Hydro to proceed to the next phase of its planning process for new bulk power facilities in that region. These facilities, which are expected to take the form of high voltage transmission lines, will require review and approval under The Environmental Assessment Act.

No action has been taken by the Government on RCEPP's Southwestern Ontario report pending review of the Commission's Final Report. The Final Report was issued on March 26, 1980. The Government's review and response to the Final Report is being coordinated by the Ministry of Energy.

(xii) Canada/U.S. Discussions on Improving the Electricity Exchange Between Countries

The Ministry took part in discussions requested by the United States to determine methods of improving the "Electricity Interchange" between countries. The discussions began in February, 1978. A report, representing the position of the utilities in Ontario, New York and Michigan, and other Canadian and United States border utilities, was published in June, 1979.

The Minister tabled the report in the Legislature on June 14, 1979. At that time, he stated that most, if not all, of the recommendations in the report that apply to Ontario's jurisdiction, had already been put in place. He also stated that Ontario Hydro was negotiating with other Canadian and U.S. jurisdictions to develop further export markets.

(xiii) Fusion

Support continued for research and development activities related to fusion in the area of materials and engineering.

The Ministry of Energy provided assistance to the University of Toronto's Institute for Aerospace Studies for experimental facilities to study the resistance of materials to surface attack by atomic hydrogen. Support was also provided to McMaster University for their work on plasma-wall interaction studies in Tokamak fusion devices.

(xiv) Hydrogen

The Ontario Government set up a special task force in February to study the role of hydrogen in Ontario's energy future, and to suggest areas of possible Provincial Government involvement.

Over the next year, the task force will examine existing hydrogen energy technology, review research, development, and demonstration requirements, and suggest possible hydrogen development strategies for Ontario.

D. Coal, Lignite and Peat

The terminal and trans-shipping facilities at Thunder Bay operated smoothly during the year. Some 2.2 million metric tonnes of Western Canadian coal passed through these facilities.

These terminal and trans-shipping facilities -- with their ultimate capacity in excess of five million metric tonnes -- were designed to provide Ontario Hydro with additional security of supply by giving it access to an alternative source of coal. By the early 1980s, Hydro's contracts with Western Canadian producers will rise to approximately 3.2 million tonnes per annum. It is anticipated that the remaining capacity at Thunder Bay will be used by Ontario steelmakers and other industries.

Onakawana Development Ltd., and Ontario Hydro continued with their detailed studies on Ontario's only known coal deposit, the Onakawana lignite deposit near James Bay. These studies are scheduled for completion in early 1981. Their results will determine whether it will be economically feasible to build a power station at Onakawana in the late 1980s or 1990s.

The results of a study of coal supply and demand in Ontario were updated and edited during the year and will be published in 1980.

Coal requirements for utility purposes are expected to remain relatively static into the mid 1980s. Steel industry plans to increase capacity indicate modest increases in coal requirements to 1990.

In October 1979, the Ministry announced a program to examine Ontario's energy resources. Plans were made during the year to conduct an Energy Audit to include an assessment of lignite and peat deposits.

Also during the 1979/80 fiscal year, the Ministry of Energy participated with Gulf Oil Canada Ltd., The Steel Company of Canada Ltd., Ontario Hydro and the Federal Department of Supply and Services in an experimental program to develop a technique of combustion of coal-oil slurries and coal-oil-water emulsions. The objective of this program was to extend fuel oil supplies with finely comminuted coal. The work was performed by the Ontario Research Foundation.



E. Uranium

During 1979, the expansion of production facilities at Elliot Lake by Denison Mines and Rio Algom proceeded according to the planned budget and time schedule. First deliveries of uranium to serve Ontario Hydro's long-term requirements through to 2020 will begin in 1980.

The anticipated discussions regarding proposed Bill C-14, 'An Act to provide for the regulation, control and supervision of nuclear energy matters related thereto' (the Nuclear Control and Administration Act) and Bill C-64, 'An Act respecting uranium and thorium mines' (concerned with foreign ownership) did not materialize in 1979.

The Federal Government did, however, announce its intention to have a Joint House of Commons Senate Committee inquire into "economic, social, environmental, health and international considerations bearing on the role of the

Government of Canada in the development, use, regulation and export of nuclear energy." Because of the February, 1980 change in the Federal Government, this initiative too remained in abeyance while the new Government's intentions became clear.

During the mid 1970s, Ontario Hydro participated with Norcen Energy Resources Ltd. in a joint venture exploration project which resulted in the discovery of the Blizzard ore body in British Columbia. Further work proved that developing this ore body would be economic and Hydro had hopes of obtaining uranium from the deposit commencing in the early 1980's. In February, 1980, however, the British Columbia Government placed a seven-year moratorium on uranium mining and exploration in that Province. As a result of the moratorium, the availability of this uranium is now subject to question. The proposed quantities of uranium from the Blizzard mine would have been small relative to total requirements. Thus, Ontario Hydro will not be adversely affected.

A \$3.4-million investment instituting conservation measures in Ontario Government buildings resulted in over \$7-million savings and over 15 per cent energy savings in just two years. Final figures for the fiscal year 1979-80 are not yet available, but it is expected that they will add significantly to previous savings.





The Province budgeted \$7.2 million for energy conservation projects during the fiscal year. Projects were developed under three sectors: residential/consumer; transportation/urban development; commercial/industrial.

(i) Residential/Consumer

The activities in this area fell into two categories: initiatives directed at improving the heat retaining qualities of new and existing houses; efforts directed toward energy education to ensure that young Canadians are equipped to deal with a rapidly changing energy future.

During July, 1979, the Ministries of Energy and Education and the Ontario Teachers' Federation held a three-week, professional development seminar for 50 Ontario teachers. These teachers will act as energy education resource people in their respective Boards of Education, and will assist their fellow teachers to include energy matters in their classroom activities.

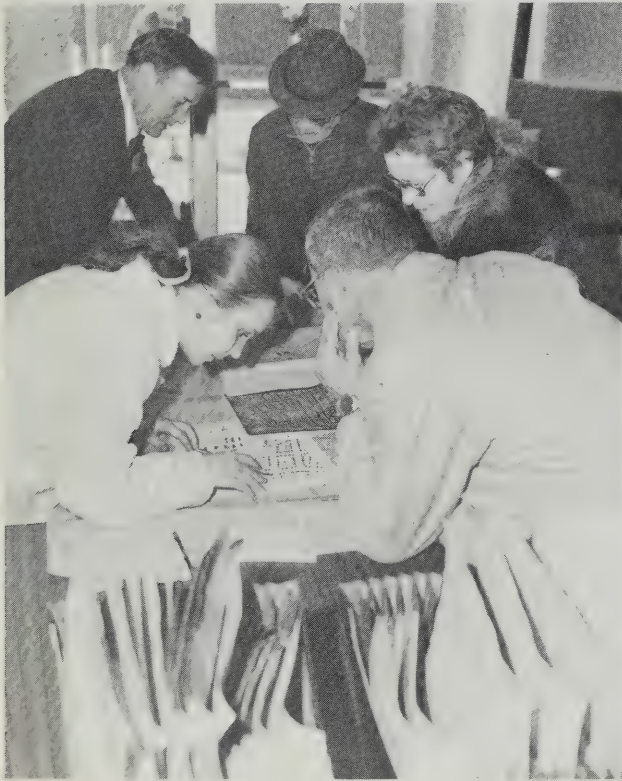
The summer seminar was based on the concept of the highly successful, Government-sponsored workshop which 60 Toronto high school students attended during the summer of 1978. During the first week of the three-week seminar, information on all aspects of the energy situation in the world today -- and especially in Canada -- was presented to the teachers. During the last two weeks of the seminar, teachers participated in workshops which focused on opportunities for teaching Ontario students about energy.

During the fiscal year, the Ministry of Energy funded the Ministry of Education's development of Energy in Society Part II, (a curriculum guide for teachers - intermediate level) as well as the Ministry of Education's development of Curriculum Ideas for Teachers (15 booklets on teaching ideas for the primary and junior levels). These booklets are to be available during the next fiscal year.

In previous years, the Ministry of Energy assisted homeowners to conserve energy through its home energy audit program and its thermography clinics. This year, these two successful approaches were combined into one project called "Heat Save."

At a "Heat Save" clinic, homeowners can view aerial thermograms -- "pictures" indicating heat escaping from the attics of their homes. They receive expert advice on the thermal characteristics of their homes from specially trained counselors in order to identify heat loss problems and possible solutions. A detailed computer analysis of the heat loss, the costs of suggested improvements, and what the energy savings would be in dollars if the improvements are made, is also available to each homeowner at no cost.

During 1979/80, "Heat Save" clinics were carried out in Kingston, St. Catharines and Cornwall. In each city there were clinics in numerous neighbourhood locations. Local utilities assisted in the planning and management of the projects. Thermography interpretations were done for 35 per cent of the owner-occupied dwellings in Kingston, 20 per cent in St. Catharines and 30 per cent in Cornwall.



Residents review their homes' heat loss with experts. A five-year \$4.9-million "Heat Save" Conservation Program, designed to improve home energy efficiency through thermography or "heat loss images", was announced in March, 1980. It will offer free analysis in 60 communities representing 42 per cent of the population. "Heat Save" clinics were held in Kingston, St. Catharines and Cornwall during 1979-80.

The Ministry continued to monitor the effectiveness of its Heat Save projects. During the year, research on the four

initial pilot projects showed fuel savings of between \$3 and \$4 for each dollar of program expenditure. In addition, post-project monitoring was continued to ensure that these benefits were continuing.

Based on this research, the Ministry sought and obtained approval to extend the program. In March, 1980, the Minister of Energy announced a five-year, \$4.9-million "Heat Save" program that will bring "Heat Save" clinics to 60 additional communities throughout Ontario.

In January, 1980, the Ontario Ministry of Energy and the Housing and Urban Development Association of Canada (HUDAC) jointly released A Builders' Guide to Energy Efficiency in New Housing. The Guide is designed to assist Ontario's and Canada's home building industry in designing and constructing energy-efficient homes. It is aimed specifically at builders of low-rise housing -- single-family dwellings, townhouses, duplexes and three-storey walk-up apartment buildings -- the most prevalent form of new housing today. The Guide offers methods of improving the thermal performance of building shells and heating systems. It also indicates the capital costs and the payback periods of the various improvement options.

The Ministry continued to work with the Ministry of Consumer and Commercial Relations to upgrade the Ontario Building Code to reflect current requirements for energy conservation in construction. The Ministry prepared and submitted extensive comments to the latest Code revision proposals. It is expected that the revised Code will be issued in the coming fiscal year.

The Ministry also continued to work with the Ontario Petroleum Association to upgrade the skills of domestic burner mechanics. A training manual was developed to equip mechanics to install and service efficiency improving retrofit equipment.



(ii) Transportation/Urban Development

The Ministry of Energy jointly conducts the Transportation Energy Management Program (TEMP) with the Ministry of Transportation and Communications (MTC). The program's overall goal is to reduce Ontario's energy consumption in the area of transportation by 10 per cent by 1985.

TEMP has five major components: improving the energy efficiency of transportation technology; improving the efficiency of operations; using more efficient modes; developing alternatives to oil; reducing the need for travel.

In September, 1979, the TEMP Phase I report was published. It reviews the comprehensive assessment of conservation measures in transportation. During the fiscal year, devices and additives to improve fuel economy continued to be tested. Projects to demonstrate how traffic management can be improved by such practices as computer-controlled signal operations were begun. The van pooling outreach program aimed at large employers continued, and the demonstration project within MTC itself, which involved three vans, saved more than 60,000 litres of fuel. As well, possible alternatives for gasoline such as propane and methanol have begun to be assessed for technical and economic feasibility, and a municipal advisory group on transportation energy conservation was formed.

In March, 1980, the Ministry of Energy established a task force to investigate the use of hydrogen. This complements the work of another interministry task force, set up at the same time, whose purpose is to re-examine the economic and strategic role of renewable resources in synthetic liquid fuel production.

The urban development activities of the Ministry can be divided into three areas: community-scale technology; planning and design demonstrations; and energy planning guidelines. District heating and energy from municipal waste technologies are being actively explored by the Ministry of Energy and have significant implications for community planning. Several engineering studies of possible district heating applications, including St. Lawrence in Toronto, were completed during the year. Investigations on means to implement them are underway.

Significant energy savings can result from improvements in the planning and design of new subdivisions. With this in mind, the Ministry of Energy published Subdivisions and Sun in October, 1979.

Various ways of planning subdivisions for energy efficiency are illustrated in Subdivisions and Sun. Factors such as road patterns, climate, shadowing and landscaping are taken into consideration. In a parallel study conducted with the Ministry of Housing, a computer model that analyses the energy savings attributable to each factor was prepared.

During the fiscal year, energy budgets, housing designs and construction criteria were prepared for a non-profit housing project in Peel Region. The energy budgets will provide targets for energy consumption and the designs and construction criteria will help to ensure that these targets are reached. The results of this study are applicable to other, similar housing projects.

As part of the municipal planning process, energy conservation guidelines are also being prepared for a large mixed-use development in Mississauga.

In order for energy-efficient urban development to take place, it is important that community planners keep abreast of innovative planning methods. In order to present and discuss practical information for energy-efficient planning, five seminars for planners were held across the province in January, 1980. A bibliography of relevant information was distributed, and a resource package for planners is in the process of being compiled.

Municipalities can play an important role in the area of energy conservation. In California, for example, many municipalities have had experience in promoting wise energy use. In January, 1980, the Ministry of Energy published New Directions in Municipal Energy Conservation: The California Experience. This publication discusses the role of those California municipalities and its relevance to Ontario.

(iii) Commercial/Industrial

A number of Ontario Ministries including Government Services, Colleges and Universities, Education, Health, Housing, Community and Social Services and Correctional Services have continued their involvement in the Ministry of Energy's Five-Year Energy Management Program. The aim of the program is to reduce energy consumption in buildings owned and operated by the

Government and in other publicly funded buildings such as schools and hospitals.

The target of the program was to reduce total energy consumption in Government buildings by 15 per cent by 1981/82. During the 1979/80 fiscal year, however, several of the participating Ministries either met or exceeded this target. The Ministry of Government Services, for example, has achieved a 19 per cent reduction in total energy consumption compared with 1976/77. While the Ministry of Education reported savings exceeding seven per cent for 4,450 schools, a number of school boards have significantly exceeded this level of achievement.

During the fiscal year, the Ministry of Energy published five case studies which deal with a variety of Government buildings which have realized substantial energy savings as well as significant cost avoidance on their energy bills.

In April, 1978, Premier William Davis set the stage for cooperation between the public and private sectors. He asked owners and tenants of major downtown Toronto office buildings to participate in a five-point program designed to promote wise energy use in commercial buildings. The Ministry of Energy held a progress review seminar on this subject in March, 1979 and again in March, 1980. Approximately 100 people attended each seminar.



Since the inception of the Downtown Energy Program, 29 participating companies have appointed energy coordinators. During the 1979/80 fiscal year, 17 companies reported energy savings of more than 22 per cent.

At 1978 prices, this decrease in energy consumption represents a saving of over \$2.5-million. This is the equivalent of enough fuel oil to heat 7,800 homes for one year.

Through a joint steering committee formed in the spring of 1979, the Ontario Government has been working to encourage and guide the province's 837 municipalities in setting up voluntary energy conservation programs. The Government is working through the Municipal Liaison Committee (MLC) which has appointed the Association of Counties and Regions of Ontario (ACRO) as its delegate on the joint steering committee to work with the Ministry of Energy.

Initially, seven areas have been identified where opportunities for energy savings exist: buildings; transportation building codes; waste recovery; property standards bylaws; street lighting; community planning.

The Joint Steering Committee suggested a target of 10 per cent reduction in energy consumption as a realistic level which municipalities could meet if they introduced straightforward housekeeping measures rather than expensive, capital-intensive measures.

The Ministry of Energy offers technical advice and guidance as well as printed and audio-visual resource material. In addition, the Ministry held a number of seminars dealing with energy management initiatives in buildings, community planning, transportation and street lighting.

Since the inception of the Provincial-Municipal Joint Steering Committee on Energy Conservation, more than 130 municipalities across the Province have appointed energy coordinators.

The Ministry of Energy, with Energy, Mines and Resources Canada, largely financed the Royal Architectural Institute of Canada's Energy Conservation Design Resource Handbook, which was published during the fiscal year. The Ministry of Energy also served on the Advisory Task Force and the Editorial Advisory Review for this publication.

Aerial view of Canada's first solar-heated school, Applewood Public School, was built in St. Catharines at a cost of \$845,000. Ministry officials continue to monitor and assess the effectiveness of the school's solar system.





In support of the policy initiatives set out in Energy Security for the Eighties: A Policy for Ontario, the search for renewable energy alternatives has also been given increased priority in the Ministry. This year, the Ministry spent \$2.6-million on programs in this area.

Major areas forming the focus of the program include: energy from waste and alternative liquid fuels from biomass, solar energy, and remote power systems (wind and small-scale hydraulic systems suitable for remote areas of the province).

(i) Energy from Waste and Alternative Liquid Fuels from Biomass

Energy from waste -- municipal solid waste (MSW), forest and mill residues, agricultural and animal wastes, and by-product heat -- has been identified as Ontario's largest new potential source of renewable energy -- other than hydraulic -- over the next 15 years. In March, 1980, the Ministry released a policy document Energy from Waste: A program for Ontario which describes opportunities in this promising area, and outlines the role of the Ontario Government.

An engineering study completed in August, 1979, determined that an energy-from-waste plant to recover energy from garbage and local wood waste in North Bay would be technically feasible. The energy from this waste would be used to produce a portion of the steam used at the Nordfibre plant. The Province, the City of North Bay and the Nordfibre Company have hired a consultant who is investigating the economic feasibility of such a plant and the optimum approach to financing the facility.

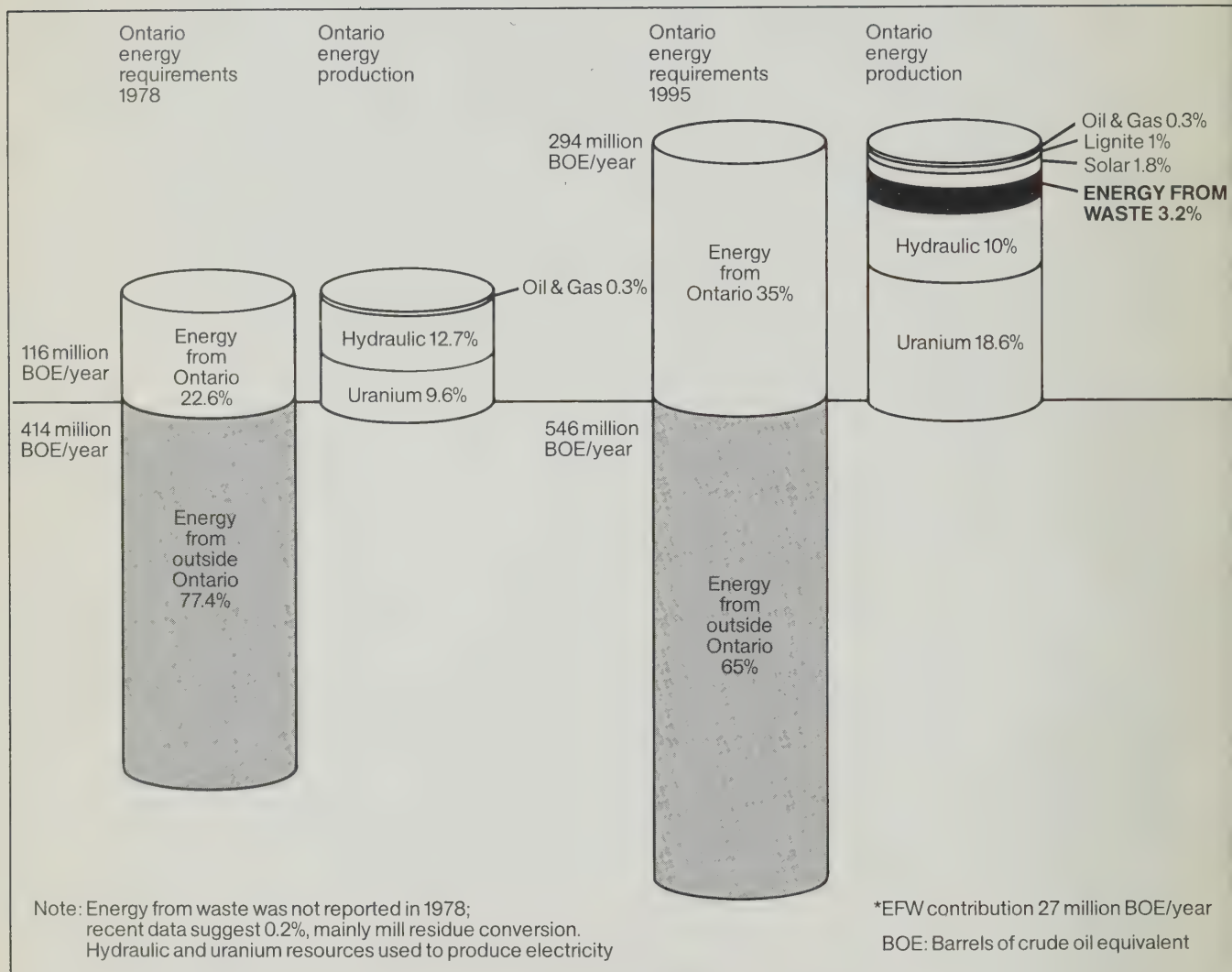
The Ministry of Energy is also involved in two studies to determine the feasibility of using approximately 500,000 tons of Metropolitan Toronto's garbage each year to produce steam for a Toronto district heating project with the added possibility of electricity production. The Ministry of Energy has offered to share the cost of the downtown Toronto district heating incinerator study with the City of Toronto, Metro Toronto, and the Federal Government. The cost of the alternative -- a study on the cogeneration of district heat and electricity at the R. L. Hearn generating station -- is being shared by the Ministry of Energy and Ontario Hydro.

In July, 1979, the Province announced two studies to determine the potential for energy from waste plants in the Niagara region.

The results of one study, in St. Catharines, will determine whether it is economically feasible to burn an estimated 100 tons of city garbage a day to produce steam for use in the General Motors of Canada Ltd. plant. The Province is paying 50 per cent of the estimated \$50,000 cost of this study. The other half is shared equally by the City of St. Catharines and General Motors.

The results of the second study will determine whether it is economically feasible to burn up to 2,400 tons of municipal solid waste per day in a cogeneration plant linked to the Ontario Paper Co. Ltd. plant at Thorold, Ontario. The Province is paying 50 per cent of the estimated \$200,000 cost of this study. The other half is to be shared equally by the regional municipality of Niagara and Ontario Paper.

The Energy Potential of Waste In Ontario





A smaller project, announced in March, 1980, will investigate the use of wood to heat the gymnasium of the Monteith Correctional Institution near Timmins.

As a follow-up to the recommendations of the Ministry's Advisory Group on Synthetic Liquid Fuels, a number of projects dealing with production of liquid fuels from biomass were continued this year. In addition, several new projects were begun.

For example, ethanol, the alcohol basic to wines and spirits, was investigated for possible use in transportation. A study prepared for the Ministry of Energy concluded that the cost of producing ethanol, on a volume basis, with the same energy content as gasoline, would be about three times that of producing gasoline, at May, 1979 prices. The study also indicates, however, that up to 20 per cent ethanol can be blended with gasoline. Gasohol (gasoline with 10 per cent alcohol) can be used in existing cars with only minor modifications to the car engines.

Another study investigated the possibility of producing methanol, or liquid fuel by direct synthesis, from wood. The results of this assessment indicated that both methanol production or the direct liquifaction process hold promise for the future, and further work in these areas was recommended.

In March, 1980, an interministry task force was convened to bring these findings together and to clearly define the economic and strategic role of renewable resources in synthetic liquid fuel production. Far ranging in scope, this task force is also addressing such diverse factors as competing land use and the most appropriate end use strategy for the various alternative liquid fuels.

(ii) Solar Energy

A wide disparity in the quality and scope of performance data concerning solar systems has plagued solar energy proponents for a number of years.

During the 1979/80 fiscal year, the Ministry of Energy completed a standardized method for collecting data which will be used in all future Government solar demonstrations at both the federal and provincial levels. As well as reducing the cost of monitoring systems and producing data at a faster rate, this method will increase the quality and reliability of the data collected.

As previously noted, The Ministry of Energy, in conjunction with the Housing and Urban Development Association of Canada (HUDAC), produced A Builder's Guide to Energy Efficiency in New Housing in March, 1980. This publication deals with methods of reducing heat loss from building shells and introduces builders to the concept of passive solar heating. A parallel report, entitled Residential Passive Solar Heating Review of Design Aids, was produced by the Ministry of Energy. It contains a more detailed review of passive solar heating techniques and includes a design aid for home designers.

The Ministry of Energy and HUDAC also agreed to jointly develop and analyse 10 to 12 passive solar heated building designs in preparation for a major demonstration phase. This phase will be carried out during the 1980 construction season. Assistance for these projects would come from the Canada/Ontario Bilateral Agreement.

The Ministry continued to monitor and assess previously commissioned solar demonstrations. They include: four domestic hot water heating systems located in Ontario Housing Corporation single family homes; a package space heating system, called "a backyard solar furnace," designed to provide part of the heat for a Toronto bungalow;

a senior citizens' residence in Aylmer, the first Canadian apartment building to be substantially solar-heated; West Humber Collegiate in Etobicoke which has a solar system that provides about half of the school's hot water needs; Applewood Public School in St. Catharines, Canada's first solar-heated school.

Progress reports on these demonstrations will be issued during the 1980/81 fiscal year.

The solar hot water system designed to preheat hot water for laundry and general use at the Oakville-Trafalgar Memorial Hospital was put into operation during the 1979/80 fiscal year. The solar heating system for the swimming pool at Richvale Community Centre was put into operation during the summer of 1979.

The Ministry of Energy provided assistance to the solar industry in general by participating on the Executive Committee of the Canadian Standards Association (CSA) Committee on Solar Standards and on the Technical Committee which produced and published the CSA Preliminary Standard for Solar Collectors. In addition, four domestic hot water systems were evaluated under laboratory conditions. The results of these evaluations will assist manufacturers in developing hot water systems.

The Ministry of Energy initiated a number of studies to be completed and published during fiscal 1980/81. These include: a study to identify potential industrial applications for solar energy; a study to assess the potential of simple thermosyphon water-heating systems suitable for cottages; a study to determine the amount of labour, materials and capital investment required to achieve the Ministry's solar energy target as outlined in Energy Security for the Eighties: A Policy for Ontario; and a study to develop tools for planners to use in calculating

shadows. These tools will be necessary when planning for access to sunlight.

The Ministry also completed feasibility studies to determine the cost and performance of solar energy systems in apartment buildings, row housing and a gymnasium complex at a community college.

(iii) Remote Power Systems

Part of the Ministry of Energy's Renewable Energy Program involves studying various means of providing electrical power to locations remote from the Ontario Hydro grid. The most popular power system for such locations is currently the diesel-powered generator. In some of these remote areas, however, diesel fuel is very costly, and alternative energy sources, such as wind and small-scale hydraulic systems, become competitive.

As a follow-up to its smaller project on Toronto Island, the Province is proceeding with its plans to test a 50 kilowatt wind-diesel generator in the Sudbury area. The Sudbury project will be erected in fiscal 1980/81. A study recently released by the Ministry of Energy showed that when coupled with diesel generators, such wind generators show promise for use in certain remote areas of the Province.

Following a survey of hydraulic potential in remote communities, the first field installation of a combination diesel/low head hydraulic power system was developed in cooperation with the Ministry of Northern Affairs and Ontario Hydro for the community of Sultan. The final engineering is in progress and installation is targeted for late 1980.



Conservation and Renewable Energy Programs -- Communications

Responding to public inquiries and disseminating information is an important part of the Conservation and Renewable Energy Programs. During the year, the Ministry's Communications group dealt with thousands of telephone queries, personal queries and letters requesting information on Ministry projects.

The Communications group produced a film, Energy Conservation: Municipal Achievements. The film deals with energy conservation case studies in four municipalities.

In addition, the Communications group co-produced two films with the Ministry of Education. Applewood, a general-audience film, deals with Canada's first solar-heated school. Applewood: Today for Tomorrow, is aimed at technical audiences.

During the fiscal year, the Communications group produced Conservation Gazette, a 12-page tabloid aimed at children aged seven to 14.

This newspaper contains articles, children's drawings and quizzes about energy conservation and renewable energy.

The Communications group also developed displays which are designed to inform the general public about conservation and renewable energy opportunities. These were presented at the following exhibitions: Lakehead Exhibition in Thunder Bay; Central Canada Exhibition in Ottawa; Western Fair in London; the Energy Lifestyle Show in Mississauga; the Canadian Energy Exposition at Toronto's Science Centre, the National Home Show in Toronto; and the Canadian National Exhibition in Toronto.

During the year, the Communications group also published a number of technical reports on Conservation and Renewable Energy projects. (See Page 10 for details.)



George Ashe, MPP for Durham West and Parliamentary Assistant to the Minister of Energy, presents Nancy Kopriva of Brampton with an energy conservation T-shirt. The Ministry asked children to draw pictures on ways to conserve energy. Nancy's drawing won. She showed that as the cost of gasoline for cars goes up, more and more people will ride bicycles or take buses to conserve energy.

Conservation and Renewable Energy Program - Bilateral Agreement

In May, 1979, the Federal and Provincial Governments signed a five-year, \$58 million bilateral agreement to develop and demonstrate conservation and renewable energy technologies. Under the terms of the agreement, projects are being undertaken in such areas as transportation, energy from waste, district heating and solar energy. The Federal and Provincial Governments will share the costs of such projects equally over the span of the program. Third parties may also participate in projects and will normally be expected to assume a portion of the costs.

The first program initiated under the terms of the bilateral agreement has the broad objective of developing, demonstrating and encouraging the house-building industry to adopt promising new technologies or new applications which conserve energy either by using renewable resources or by making conventional resources more efficient.

The projects being selected and to be managed by the Housing and Urban Development Association of Canada (HUDAC) on behalf of the Ministry of Energy, will deal with urban form, architecture, building systems and building materials.

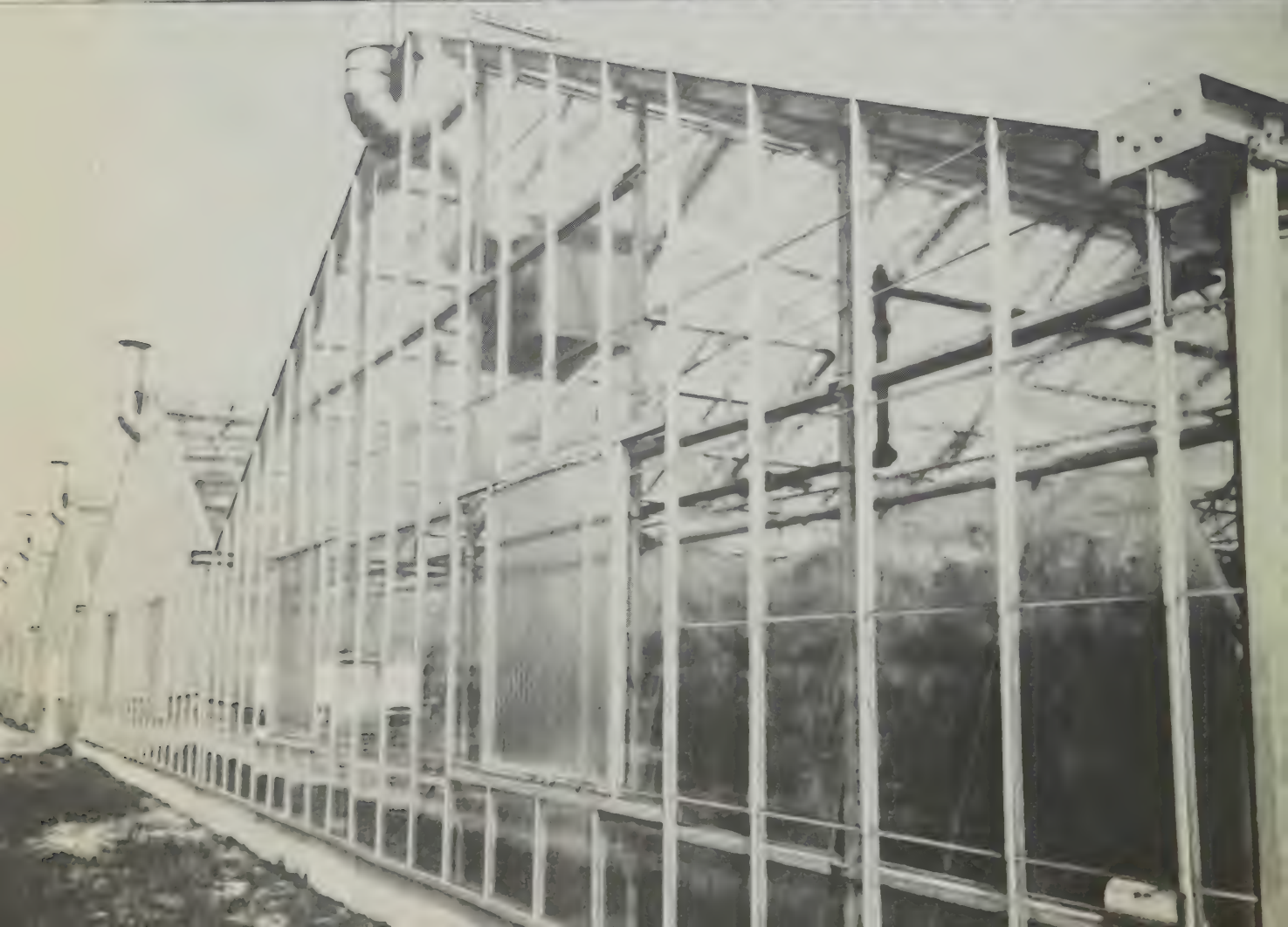
Energy from waste, transportation, wind power and industrial projects are also prime candidates under the Bilateral Agreement.

Projects in the transportation sector will be managed by staff at the Ministry of Transportation and Communications (under the Transportation Energy Management Program). Projects in the industrial sector will be managed by the newly established energy section of the Ministry of Industry and Tourism.



This program involves essentially the regulation of the Ontario natural gas utilities and the administration of The Ontario Energy Board Act. Approximately half of the Energy Board's resources are directed to regulation and half to the support of the Ministry's Conventional Energy Program, specifically, the review of Ontario Hydro's electrical rates and rate structures.

Details of the Regulatory Affairs Program can be obtained by reference to the latest Annual Report of the Ontario Energy Board.





In April, 1979, the Honourable James Auld, the then Minister of Energy, announced the restructuring and refinancing of the Ontario Energy Corporation. The purpose of this restructuring and refinancing was to enable the Ontario Energy Corporation to participate in the commercialization of suitable energy projects to a broader degree.

The Corporation now operates as a financially self-sustaining entity. Control is exercised by the Government through its share ownership, and through the Corporation's Board of Directors. The Minister of Energy continues to hold all of the issued common shares of the Corporation and the Deputy Minister of Energy continues as Chairman and Chief Executive Officer. In accordance with Government policy, a Memorandum of Understanding between the Corporation and the Minister of Energy was tabled in the Legislature.

The Corporation's five-member Board of Directors, previously made up of public servants, was changed to include two private sector members in order to strengthen the commercial direction of the Corporation's affairs.

During 1979, the Corporation participated in or was actively pursuing investment opportunities in four areas:

Energy resources -- assessing commercial projects in the conventional energy field such as oil, gas and lignite exploration and Polar Gas;

Alternate energy -- assessing investments in synthetic liquid fuels, energy from municipal/forest waste, and the renewable energy development organization proposed by the Minister of Energy;

Power-sharing projects -- investigating investment opportunities in energy production through industrial cogeneration, by-product heat, and related schemes such as the Bruce AgriPark;

Energy transportation -- focusing on conserving gasoline use, through commercial, transit-related energy investments, and van pooling.

Further information is provided in the 1979 Annual Report of the Ontario Energy Corporation.

Following research and promotional efforts sponsored by the Ontario Energy Corporation, a joint venture with five private companies was formed in 1979 to finance the research, design and development phase of the Bruce AgriPark. The AgriPark design will enable greenhouse and fish farm operators to run their own family-size businesses while benefiting from the shared cost of the heat supply and other common services such as packaging and shipping.

STRATEGIC PLANNING AND ANALYSIS

A. Energy Modelling

During the year, the Ministry undertook a number of initiatives aimed at both maintaining and further developing its energy demand forecasting model as well as improving the Ministry's knowledge of how energy is used in Ontario.

Early in the fall of 1979, Data Resources Inc. was commissioned to provide economic projections of major economic indicators for Ontario. These projections served as a backdrop for the Ministry's strategic planning activities which included a 25 year projection of the province's future energy requirements.

B. Heat Pumps

During the past four to five years, there has been a renewed interest in using heat pumps for space-conditioning of commercial and residential buildings. This has been due partly to the energy conservation feature of the heat pump and partly to technical improvements in the equipment.

The Ministry undertook a study to assess the potential for heat pumps in Ontario's commercial and residential sectors over the next 25 years. This information was used in the Ministry's energy demand scenarios which determine the relative contributions that electricity, oil and gas could make in meeting the energy requirements for space conditioning in commercial and residential buildings.

C. Incentives for Energy Conservation in Industry

The Ministry of Energy, in collaboration with the Ministry of Industry and Tourism, completed a study to identify existing incentives for energy efficiency in the Ontario manufacturing sector. The study also outlined possible practical programs which would substantially

increase efforts by industry to become more energy efficient.

D. Scanada Study

The Ministry commissioned a study to estimate what the costs and potential energy savings would be if the thermal characteristics of the Ontario housing stock were upgraded.

E. Ontario Energy Review

In July 1979, the Minister of Energy published the Ontario Energy Review. This publication was designed to help the Ontario public and policy-makers become more familiar with the province's energy situation. Rather than discussing energy policy, the review presented a range of basic information guiding that policy.

The review was presented in two parts. The first part outlined recent trends in the supply and consumption of each type of energy used in Ontario. It examined the province's energy production and distribution networks. It looked at changes in energy prices and described provincial initiatives to develop forms of renewable energy and implement conservation programs. The second part of the review presented three different views of how Ontario's energy needs may change over the next twenty years as well as the likely sources of energy supply.

F. Liaison with Ontario Hydro

During the year, the Ministry of Energy and Ontario Hydro developed a process for exchanging information on the assumptions and projections of future energy and electricity supply, demand, and prices. As well as providing a review of future energy supply sources and prices the Ministry provided Ontario Hydro with the preliminary results of the update of its projections for future energy requirements



Ontario Hydro used this information in its electricity load forecasting exercise. The Ministry of Energy's projections of Ontario's energy requirements were presented to the Ontario Hydro Board of Directors as part of the information package related to Ontario Hydro's load forecast. This activity culminated with the public release of Ontario Hydro's long-term load forecast on January 16, 1980.

G. Policy Analysis Support

Staff of the Strategic Planning and Analysis Group contributed to and provided support for the development of the Ontario Government's position on crude oil and natural gas pricing, and Energy Security for the Eighties: A Policy for Ontario.

Staff also undertook a considerable number of analysis tasks for other groups in the Ministry. These related to the development of programs or policies that will address the targets enumerated in Energy Security for the Eighties: A Policy for Ontario.

H. Taxation and Fiscal Incentives for Conservation

Members of the Strategic Planning and Analysis Group participated in the development of possible taxation and fiscal policy incentives designed to encourage energy conservation and renewable energy use in Ontario. Three sectors were specifically addressed: transportation; commercial and industrial space and water heating; energy from waste.

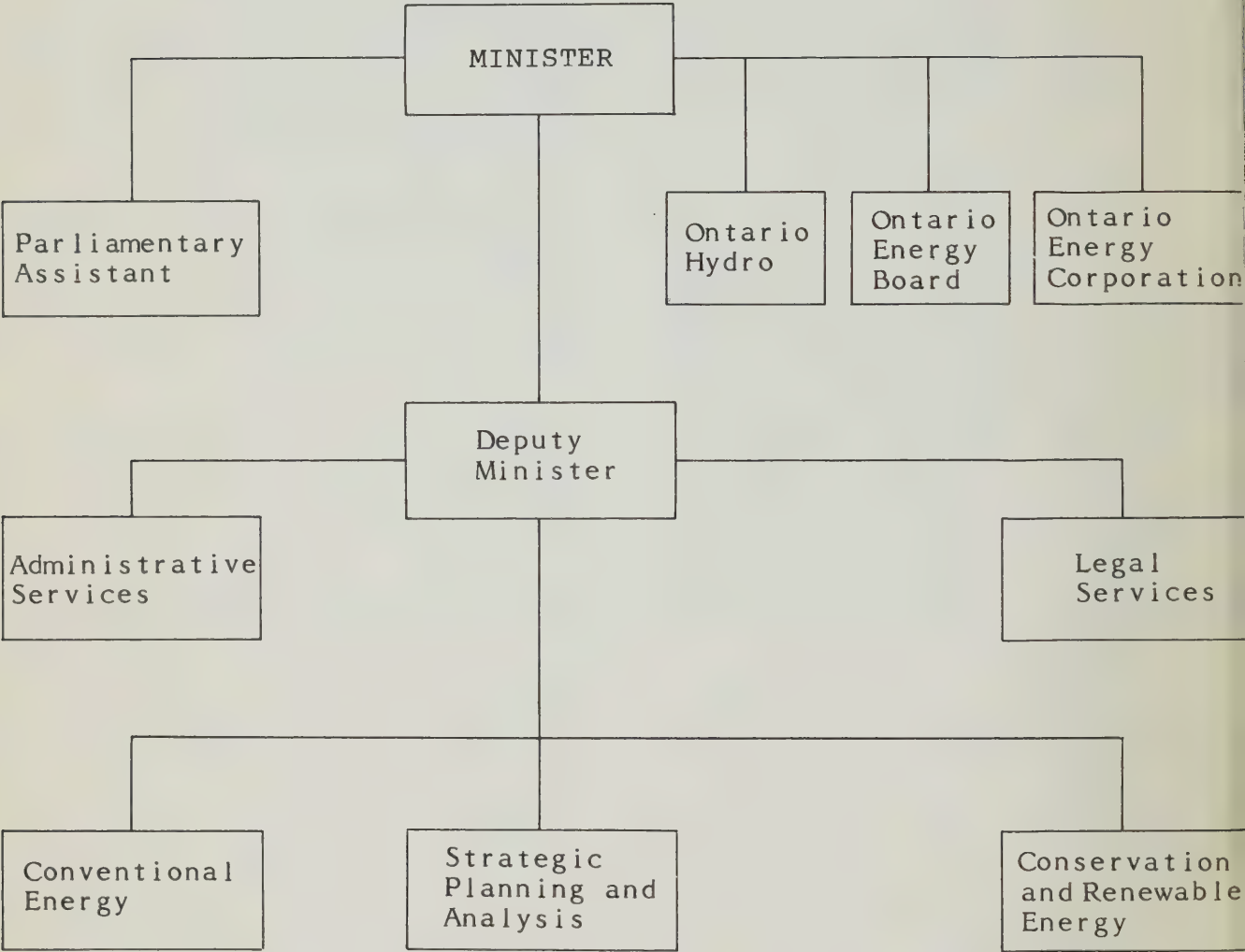
In the transportation sector, particular attention was given to encouraging alternatives to petroleum-based motor fuels, improved motor vehicle performance, and improved utilization of the existing transport infrastructure.

The focus in the commercial and industrial sectors was to reduce heat loss and increase heat recovery from exhaust air and waste water.

Proposals were made for more favourable tax treatment of private sector investments in facilities designed to generate energy from municipal solid wastes.

MINISTRY ORGANIZATION

(Total Classified Staff
as of March 31, 1980 - 100)



PROGRAM ESTIMATES



THE ESTIMATES, 1980-81 MINISTRY OF ENERGY SUMMARY

1980-81		1979-80	1978-79	
Estimates	PROGRAMS	Estimates	Actual	Estimates
\$		\$	\$	\$
1,959,116	Ministry Administration	1,507,920	840,088	885,000
2,786,000	Conventional Energy	2,263,000	1,714,955	2,321,000
6,971,000	Renewable Energy	2,590,000	1,110,238	2,455,000
17,552,000	Energy Conservation	7,187,000	4,130,983	5,350,000
1,465,000	Regulatory Affairs	1,331,000	1,175,806	1,239,000
---	Energy Supply	550,000	20,809,854	21,619,000
30,733,116	Ministry Total	15,428,920	29,781,924	33,869,000
	Less Statutory			
25,116	Appropriations	23,920	7,282	18,000
30,708,000	TOTAL TO BE VOTED	15,405,000	29,774,642	33,851,000

ACCOUNTING CLASSIFICATION

30,733,116	Total Budgetary Expenditures	15,428,920	9,425,398	12,769,000
---	Total Disbursements	---	20,356,526	21,100,000
30,733,116		15,428,920	29,781,924	33,869,000

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Toronto, Ontario

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Annual Report

of the Ministry of Energy
Year Ended March 31st, 1981



Energy Ontario

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Energy
Ontario

ANNUAL REPORT

Minister

Ministry
of
Energy

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May, 1981

TO THE HONOURABLE JOHN BLACK AIRD
O.C., Q.C., B.A., LL.D.

Lieutenant-Governor of the Province of Ontario

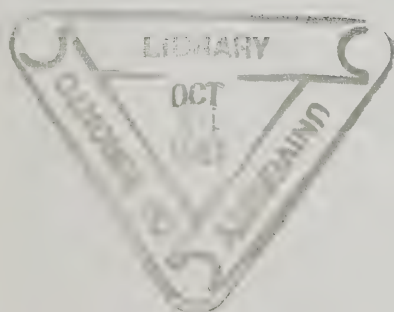
MAY IT PLEASE YOUR HONOUR:

I take pleasure in submitting the eighth Annual Report of the Ministry of Energy for the fiscal year ended March 31, 1981.

Respectfully submitted

Robert Welch

Robert Welch
Minister of Energy





The Honourable Robert Weich, Minister of Energy



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DEPUTY MINISTER'S SUMMARY

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Supply and Price Update
The Need to Get Off-Oil
Ontario's Solar Energy Program

Alternative Transportation Fuels
BILD Energy Initiatives
Energy Ontario
Conclusion

Introduction

Ontario is a prosperous resource-rich province almost totally dependent on other jurisdictions for its fossil fuels — oil, natural gas, and coal.

In fact, in 1980, Ontario purchased 75 per cent of its energy needs from others. Ontario's total energy costs amounted to some \$11 billion.

It is against this background, then, that Ontario's energy policy is developed and implemented.

Ontario, with one third of the population of Canada, has a major responsibility to contribute to the development of a national energy policy and to put in place both energy supply and demand policies which contribute both to the achievement of national goals as well as to those which meet its own needs.

This summary outlines some of the major events and policy changes over the past year and complements the Ministry Highlights section which follows.

Supply and Price Update

The security of supply and price of crude oil continued to dominate the Canadian energy scene in 1980.

The war between Iran and Iraq, which broke out in September and adversely affected world petroleum supply and price into 1981, demonstrated again the instability of world markets and the absolute necessity of Canada becoming self-sufficient in crude oil production.

The Government of Canada's National Energy Program (NEP), issued in October, was greeted with mixed reactions by the petroleum industry and the public generally. The outcome of the current debate over the appropriateness of the NEP, as the basic structure within which Canadian crude oil self-sufficiency can be achieved, is still very much in doubt.

The NEP however, incorporates many of the principles and goals espoused by Ontario, including:

- the goal of Canadian crude oil self-sufficiency by 1990;
- increasing crude oil supply through enhanced recovery, heavy oil, tar sands and frontier production;
- reducing petroleum requirements through substitution of other fuels such as electricity, natural gas, coal, energy from waste and other forms of renewable energy;
- reducing crude oil consumption through conservation;
- rejecting world price as a benchmark for pricing Canadian crude oil.

Canadian crude oil pricing negotiations stalled in July, 1980 and resulted in the federal government taking unilateral action in October, 1980 with its National Energy Program.

Alberta responded with the declared intention of reducing shipments to the rest of Canada by 180,000 barrels a day in three stages. The first cutback of 60,000 barrels a day occurred March 1, 1981.

World price for crude oil at port of loading in March, 1981 ranged from U.S. \$32.00 per barrel for Arabian light to U.S. \$41.00 for Libyan crude. Increases in the price of Canadian crude levied in 1980 resulted in the price of Alberta oil delivered to Ontario refineries reaching Can. \$24.66 per barrel. The difference between the Alberta wellhead price of Can. \$17.75 and Can. \$24.66 per barrel is accounted for primarily by federal government levies and taxes.

Preliminary figures for 1980 show that progress is being made towards Ontario's target of reducing its dependence on crude oil:

- Sales of home heating oil are down by about four per cent in this period, while
- Sales of motor gasoline hardly changed and diesel fuel sales were down slightly by one per cent.



After allowing for increased sales of motor fuels at border points, Ontario's consumption of oil products is reported to be about six per cent lower in 1980 than in 1979. Ontario's programs have contributed in part to this reduction.

Energy supply in Ontario, with the exception of electricity, primarily rests with the private sector. Increasingly, government, and particularly the Government of Canada, is injecting itself into the supply management of crude oil and natural gas.

Since these two forms of energy are not indigenous to Ontario in any quantity, this province's role in supply management is not significant.

The opposite is true in electrical supply policy. Electricity currently contributes more than 15 per cent of Ontario's energy needs. Increasingly, too, the Ontario Energy Corporation is becoming a factor in energy supply, particularly in the areas of alternate energy and powersharing, albeit it is still a minor player.

The Need to Get Off-Oil

The reduced demand for oil consumption in 1980 is an indication that conservation programs are working, but there is still much to be done.

Canada is importing crude oil at very high rates with all the adverse effects to the economy which this entails.

Accordingly, the NEP concentrates on the need to get "off-oil", and Ontario whole-heartedly supports this principle.

Indeed, over the past year, the province has instituted several programs which are complemented by the federal efforts, including:

- **HEAT SAVE** — A five-year, 60 community, \$4.9-million program of aerial thermography and home energy audits.
- **ENERGY FROM WASTE** — This 15-year, \$3-billion program is now underway, with 12 potential projects under examination, and two demonstration projects.

- **ONTARIO ENERGY SAVERS** — Since 1976, the province's energy conservation efforts have concentrated on the transportation sector with its TEMP Program — Transportation Energy Management Program. During this past year, this program complemented the driver/car maintenance demonstration project of the Ontario Energy Savers Program.

In 1980, the Ministry of Energy undertook a major initiative in the continuing development of our commitment to produce more of our own energy, and to consume less.

This initiative was the \$165-million, 10-point program to support crude oil self-sufficiency for Canada by 1990.

It includes:

- a \$75-million, five-year program to stimulate the development and marketing of alternative transportation fuels in Ontario;
- a \$50-million, five-year program to accelerate solar energy programs across the province;
- \$39 million for individual programs for conservation and conversion from oil in public buildings, municipal energy auditing, conservation and conversion from oil in Ontario government buildings, assistance to industry to do the same, revisions to the Ontario Building Code, and an expanded role for the Ontario Energy Corporation, among others.

Two of these programs — solar energy and alternative transportation fuels — are already underway.

Ontario's Solar Energy Program

The solar energy target established by the Government of Ontario is to contribute two per cent of Ontario's energy needs from solar energy by 1995. That is equivalent to 15 million barrels of oil or sufficient energy to heat more than 700,000 homes per year.

Deputy Minister's Summary

Ontario's solar strategy to 1985 has four distinct thrusts:

- to develop a viable Ontario solar equipment industry;
- to pre-build the market for solar equipment;
- to reduce barriers to the use of solar energy; and
- to assist market development through effective communications.

In this initial period of solar development, the government strategy does not include general consumer incentives.

Alternative Transportation Fuels

Transportation accounts for almost 50 per cent of all the oil used in Ontario, largely in the form of gasoline. The substitution of alternative fuels for gasoline is a key element in an overall program to reduce petroleum consumption.

There are many alternative fuels, each with different advantages and disadvantages. In this program, the ministry is examining the potential of: hydrogen, electricity, propane, compressed and liquefied natural gas, ethanol, methanol, synthetic gasoline and synthetic liquid hydrocarbons.

For some of these fuels, the target is specific. By 1985, for example, through the **Drive Propane** program, a goal of 40,000 vehicle conversions from gasoline to propane has been set.

For other fuels, such as hydrogen, the potential is vast but their contribution in the short term is more uncertain.

The overall objective is to displace by 1995 a full *ten* per cent of our transportation energy needs — the equivalent of almost 1.6 billion litres of gasoline.

BILD Energy Initiatives

The Government of Ontario's economic strategy, *Building Ontario in the 1980's*, devised by the Cabinet's Board of Industrial Leadership

and Development (BILD) and released by the Premier in January, is devoted in large part to energy issues.

Perhaps most significant is the province's reaffirmed dedication to our major indigenous energy form: electricity generated from water power and nuclear power.

Provincial initiatives in electricity will include:

- An accelerated 20-year electrical generation program, including the early completion of the Darlington Nuclear Generating Station. The BILD program stresses the fact that the CANDU nuclear generating system is a safe, clean and economical source of energy and is, on both economical and environmental grounds, an attractive alternative to coal-fired power generation.
- Upgrading transmission and distribution facilities, and developing small-scale hydraulic generating systems for remote communities to allow local enterprises to switch from oil to electricity.
- The electrification of GO Rail, which is now technically feasible, to proceed to the design stage. The government will also explore the possibility of electrification of the Ontario Northland Railway and other rail applications.
- The encouragement by the province of a greater use of electric vehicles in public transit through increased subsidies for such vehicles to replace gasoline or diesel-powered buses.
- The establishment of a residential electrical services program through which Ontario Hydro and municipal electrical utilities will offer advice and loans to homeowners to conserve energy, upgrade wiring and convert heating systems away from oil to electricity. Encouraging the use of heat pumps will be an important part of this program.



- The establishment of the Bruce Energy Centre. The government is committed to providing facilities for the sale of steam and hot water from the Bruce Nuclear Power Development for industrial and agricultural interests.
- The establishment of an Institute of Hydrogen Systems.

Other BILD Initiatives in the energy field include the previously mentioned Alternative Transportation Fuels Program, an Ontario Institute for Biomass Research to accelerate the development of hybrid trees, including those for alternative fuel production, and the establishment of hybrid poplar plantations.

Energy Ontario



Energy Ontario is now one year old. The **Energy Ontario** symbol is our way of keeping the public informed of the energy programs and activities underway throughout the Ontario government.

Through **Energy Ontario** projects, significant human resources and funds have been invested to find ways to displace gasoline and oil with more plentiful and secure forms of energy such as electricity, natural gas, coal and propane.

During the past year, major **Energy Ontario** programs have been initiated that are designed to stimulate the development of alternative forms of energy such as energy-from-waste, solar, wood and biomass.

Most importantly, **Energy Ontario** has become the symbol for energy conservation. As well, it is the symbol of a widespread communications effort to encourage energy conservation both within government and with the public.

Energy is too diffuse for any one government ministry to undertake all government programs. Consequently, some 15 Ontario ministries now have energy programs underway, each operating under the **Energy Ontario** banner and each coordinated by the Ministry of Energy as part of its overall responsibility for energy policy and its corporate management philosophy of program management.

Of these 15 ministries, special organizational structures have been set up with 6 key ministries. These arrangements form the basis of this ministry's corporate management approach and include:

- TEMP — The Transportation Energy Management Program, involving the Ministry of Transportation and Communications
- HEMP — The Housing Energy Management Program, involving the Ministry of Housing
- AGEMP — The Agriculture Energy Management Program, involving the Ministry of Agriculture and Food
- REMP — The Resources Energy Management Program, involving the Ministry of Natural Resources
- GEMP — The Government Building Energy Management Program, involving the Ministry of Government Services
- MITEMP — The Industrial Energy Management Program, involving the Ministry of Industry and Tourism.

Deputy Minister's Summary

Conclusion

This past year was one of significant energy policy change by the various levels of government and a year in which a variety of new programs were initiated.

There is every indication that this change and adaptation to new energy realities will continue into the 1980s.

Our energy needs pose new challenges. In 1980, the problems did not disappear and progress was uneven. There is some evidence that our programs are taking effect, from conservation to substitution of energy forms to the development of renewable energy. Equally, there is ample evidence that Canada is far from being out of the woods insofar as its crude oil security of supply is concerned.



Transportation accounts for about one half of Ontario's crude oil consumption, making this sector a vital target for efforts to reduce the province's oil demand. Almost three-quarters of the crude oil consumed in transportation is in the form of gasoline, and most of that is used by automobiles.

Listed below are some highlights of the policies and programs initiated during the past fiscal year by the Ministry of Energy.

POLICY: New Targets

New energy security targets were set by Ontario in 1980 to support the province's goal of crude oil self-sufficiency for Canada by 1990. These are:

- a. By 1995, Ontario expects to produce 37.5 per cent of its primary energy from sources within the province, versus about 25 per cent in 1980.
- b. By 1995, at least five per cent of Ontario's total primary energy requirements (approximately 42 million barrels of oil equivalent) will be produced from renewable and

recoverable resources such as municipal and forest wastes, agricultural crop residues, synthetic liquid fuels from biomass, and solar applications.

- c. Conservation and substitution targets were established for the residential, commercial, industrial and transportation sectors with the aim of reducing growth in secondary energy consumption in Ontario from 2.3 per cent per annum to an average one per cent per annum between 1980 and 1995. This will amount to a reduction in Ontario's annual demand for crude oil of 23 million barrels by 1995.
- d. The Ontario Energy Corporation (OEC), the province's energy investment vehicle, will expand its role in the following areas:

Highlights

1. participation in the "Canadianization" of the oil and gas industry to reduce the level of foreign ownership;
2. encouraging the development of Ontario's capability to use nuclear steam for industrial purposes;
3. increasing the emphasis on its activities in the energy from waste area;
4. investigating the commercial potential of methanol and ethanol as alternative transportation fuels.

ENERGY CONSERVATION: New Programs

A number of new energy conservation programs were instituted during 1980, including:

1. A \$3.6-million, three-year Municipal Energy Audit Program will assist municipalities to carry out energy audits of operations and to establish or expand their energy conservation programs.
2. A \$10.6-million, five-year extension of the highly successful Ontario Government Buildings Energy Management Program. A \$5.7-million investment to implement conservation measures in Ontario government buildings resulted in \$10.5-million savings and a 17-per-cent reduction in energy consumption up to and including the 1979/80 fiscal year.
3. **Energy Ontario**, an energy conservation and renewable energy program involving more than 15 ministries and agencies of the Ontario government designed to provide broad public recognition of Ontario government energy projects.
4. The \$4.5-million, Voluntary Energy Conservation Communications Program, including the Ontario Energy Savers Awareness Program, continued its multi-media campaign promoting energy conservation.

5. A five-year, \$4.9-million **Heat Save** Program, designed to improve home heating efficiency, was initiated to cover 60 major communities and 42 per cent of Ontario's population. **Heat Save** clinics have been held in Belleville, Brantford, Brockville, Cobourg, Midland/Penetanguishene, Orillia, Pembroke, Port Hope, Sault Ste. Marie, Sudbury and St. Thomas, with excellent response from homeowners to the wide range of advisory services offered.

Energy Conservation: Education

1. A comprehensive energy curriculum development program continued and a teacher professional development program entered its second stage with seminars for Junior Grade Teachers (grades four to six).
2. An Energy Alert Conference was held in Hamilton, co-sponsored by the Energy Educators of Ontario and the Science Teachers' Association.
3. The Mobile Educational Van Program began its second year with teachers visiting Ontario schools — three teams conducted 450 workshops and seminars on energy topics.

Energy Conservation: Commercial Buildings

1. The Downtown Toronto Energy Conservation Program for commercial buildings resulted in energy savings of 22 per cent. A similar program was launched February 5, 1981 in Ottawa.

Energy Conservation: Municipal

1. Municipal energy conservation seminars for municipal energy co-ordinators were held in eight regions to encourage the use of conservation measures at the local level.



On July 29, in London, Energy Minister Robert Welch (left), accompanied by Controller Arthur D. Cartier (centre), and the Honourable Gordon Walker, MPP for London South, unfurled the Ontario Energy Savers flag at London City Hall to launch officially the energy conservation campaign in the London-Sarnia area. Twelve media personalities from the region averaged a 22 per cent reduction in fuel consumption over the three-week test, one of the best showings in the province.

Energy Conservation: Oil Substitution

- 1. A three-year, \$12-million Conservation and Off-Oil Conversion Program for Municipal Buildings and Public Institutions will share the cost of oil substitution and conservation projects with municipal governments and other public institutions. The goal is to displace at least 20 million gallons of oil per year for an annual saving of \$5 million.
- 2. A 12-month demonstration of propane as a transportation fuel is underway. Called **Drive Propane**, it involves 200 fleet vehicles from both the public and private sectors monitoring fuel economy, vehicle maintenance, and fuel storage implications. A propane booklet was released to fleet managers in Ontario.

- 3. Testing of different types of propane conversion equipment and propane engine optimization continues in conjunction with the University of Toronto.
- 4. A \$2.5-million, five-year Program for Oil Substitution in Ontario government buildings will finance the conversion of more than 300 government buildings from oil to natural gas and other energy forms.
- 5. A three-year, \$10-million Industrial Energy Conservation and Oil Conversion Incentive Program will share the cost of conversions from oil to other more abundant fuels, professional engineering studies, and the purchase and installation of energy-saving equipment and materials by industrial companies located in Ontario.

Energy Conservation: Transportation

1. The Ontario Energy Corporation (OEC) is investing in a joint venture with the Teleride Corporation to develop, produce and market a public transit information system. Other computerized transit systems are being investigated. The Ministry of Energy is studying the impact of the Teleride information system on ridership in the Ottawa-Carleton area.
2. **Trucksave**, carried out with the co-operation of the Ontario Trucking Association and private industry, continues to promote fuel efficiency in truck fleet operations. *Easy Goin'*, a driver training package and slide show presentation, is now available to trucking fleet owners and operators.
3. The Municipal Transportation Energy Advisory Committee mounted a series of nine seminars to illustrate the benefits of van pooling and public transit, and to inform municipalities of energy conserving measures. Newsletters and a Transportation Energy Conservation Manual for municipalities are scheduled for publication in 1981.
4. Under the government's Transportation Energy Management Program, several ministries are participating in a Teleconferencing demonstration project to assess the feasibility of using telephone conference calls and dedicated lines to save on employee transportation costs.
5. The Ontario Van Pool Organization (OVPO) was established to promote van pooling in Ontario.
6. The Transportation Energy Management Program (TEMP) Energy Advisory Service is now operating as a telephone service for the public requesting information on ridesharing, trucking or propane.

7. A Hamilton Transportation Energy Management Study is underway to assess ways of reducing transportation energy consumption in the city of Hamilton.
8. Computer-controlled traffic signal demonstrations are underway in Kitchener-Waterloo, Durham Region and Brantford to demonstrate the practicality and cost benefits of a synchronized traffic light system in communities of this size.

Energy Conservation: Urban Planning/Housing

1. The Ministry of Energy has taken a lead role in assisting the Canadian General Standards Board to develop standards and certification for insulation installers. The program is now in place and is being co-ordinated through the Ministry of Housing.
2. Energy conservation study grants totalling \$250,000 are being provided to municipalities through the Ministry of Housing to undertake energy-related planning studies leading to the formulation of municipal energy conservation policies.
3. Urban planning studies have been funded in Woodstock, Brampton, Mississauga, Waterloo and Brantford to review zoning bylaws, construction standards, building design, and downtown commercial planning, with the purpose of maximizing energy efficiency.
4. Nine regional workshops were conducted for municipal officials and the building industry with the Ministry of Housing on the theme: "Making Better Use of Existing Resources: A Strategy for The 80's."

Energy Conservation: District Heating

1. Construction was begun on a district heating demonstration project at LeBreton Flats in Ottawa, a co-operative venture undertaken



with the Government of Canada, the City of Ottawa, the Canada Mortgage and Housing Corporation and three non-profit housing co-operatives.

Energy Conservation: Tax Initiatives

1. Tax exemptions involved removing the seven-per-cent provincial retail sales tax on specified energy-conserving materials and equipment. In the April 1980 Budget, the sales tax was removed on chillers designed to recover heat in an air conditioning system; on weatherstripping and caulking material designed for the purpose of preventing heat loss in a building; and on vehicles required to be licensed under the Highway Traffic Act for which the power to propel the vehicle is derived exclusively from electrical energy or exclusively from the combustion of hydrogen, propane, natural gas, alcohol, or manufactured gas. In previous budgets, a number of other energy conservation materials and equipment were exempted. It is estimated that reduced tax revenue could amount to about \$45 million annually.

RENEWABLE ENERGY: New Programs

1. A new five-year, \$75-million Alternative Transportation Fuels Program was announced in February, 1980. The program's goal is to displace 10 per cent of the gasoline and diesel fuel used in Ontario with alternative fuels such as propane, electricity, hydrogen and alcohol fuels by 1995.
2. Major systems development contracts for hydrogen, electric vehicles, commercial alcohol fuels, and advanced fuels and vehicles are under negotiation with the Urban Transportation Development Corporation, Ontario Hydro, the Ontario Energy Corporation and the Ministry of Transportation and Communications.

3. A \$50-million, five-year program to accelerate the development of solar energy technology and the solar energy industry in Ontario was established.
4. The five-year, \$58-million Canada/Ontario Renewable Energy and Energy Conservation Demonstration Agreement contributed to more than 20 projects demonstrating new technologies in conservation and renewable energy. Examples include district heating, energy-efficient housing, solar hot water, wood gasification, ground water cooling, electric vehicles and industrial conservation processes.

Renewable Energy: Municipal Waste

1. Activity has been expanded and accelerated under the 15-year, \$3-billion Energy from Waste Program announced in March, 1980:
 - Twelve municipal waste projects which could produce steam and/or electricity are under detailed evaluation, with a total estimated capital cost between \$317-million and \$433-million involving up to 2.2 million tonnes of municipal garbage annually. This would produce the energy equivalent of about 2.5 million barrels of oil a year.
 - Several other applications for the generation of energy from municipal refuse are being evaluated.
 - Studies are underway into the need for further development of commercial energy-from-waste systems in small communities; the use of landfill gas as an energy source; and the nature and extent of atmospheric emissions from municipal solid waste incinerators.
2. The Ontario Energy Corporation (OEC) and Tricil Limited are partners in a joint venture that will use by-product steam produced from a municipal refuse incinerator to generate 4 MW of electricity. The electricity

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produced at the Solid Waste Reduction Unit (SWARU) in Hamilton will be sold to Ontario Hydro.

Renewable Energy: Agriculture

1. Methane gas research and demonstration facilities for farm use were installed at the Arkell Research Centre near Guelph in conjunction with the Ministry of Agriculture and Food.
2. An Energy in Agriculture Policy Committee was established to develop long-range strategies for Ontario agriculture with respect to the use, substitution, supply and price of energy. The committee's report is expected in 1981.

Renewable Energy: Alcohol

1. A program to develop and demonstrate farm-scale ethanol stills was initiated in co-operation with the Ministry of Agriculture and Food.
2. A major methanol and wood energy feasibility study was launched in the Edwardsburgh area of eastern Ontario to examine the possibilities of locating facilities to produce methanol and/or steam and electricity.
3. A commercial-scale wood gasifier which converts wood waste into gas suitable for natural gas replacement began operation in Hearst with support from the Canada/Ontario Bilateral Agreement.

Renewable Energy: Wood

1. The government announced it will establish a world-class institute for forest biomass research at Maple to expand the province's expertise in breeding and developing fast-growing hybrid tree varieties for both fibre and fuel purposes.

2. Numerous projects designed to increase the availability of fuelwood were implemented in co-operation with the Ministry of Natural Resources.
3. A survey of the potential for residential wood heating in rural and small urban communities was launched in co-operation with the Ministry of Natural Resources.
4. Several projects designed to demonstrate the commercial use of wood as a fuel were initiated, the first being the use of wood to heat the Monteith Correctional Institute near Timmins.

Renewable Energy: Wind

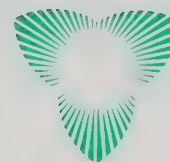
1. A major wind energy demonstration in Sudbury was initiated to evaluate the coupling of a 50-kW wind turbine to a diesel generator system to determine the performance reliability and fuel savings of a field installation in a remote community.

Renewable Energy: Hydrogen

1. A Hydrogen Energy Task Force was established to assess the role hydrogen can play in Ontario's energy future.
2. Discussions have been initiated with the federal government to establish an Institute for Hydrogen Systems in Ontario

Renewable Energy: Solar

1. Fourteen Ontario homebuilders were awarded contracts to design and construct 21 passive solar energy homes in a \$200,000 Passive Solar Housing Design Competition jointly conducted by the Ministry of Energy and HUDAC. The first house constructed as a result of the competition opened in Stoney Creek in October.



This passive solar, energy-efficient home in Belleville was one of the first built under a \$200,000 federal-provincial demonstration program. The house, designed by Wayne Storm and built by the Maurice R. Rollins Construction Company, was among 20 housing units built under the program. It is expected to cost 45 per cent less to heat each year than a standard home.

2. In co-operation with Ontario Hydro, six domestic solar hot water systems were tested at the Ontario Hydro Research Laboratory in Etobicoke. Five previously evaluated units were installed in private homes in Etobicoke for monitoring and evaluation of performance and reliability.
3. Construction was begun on a solar water heating system at Cambrian College in Sudbury.
4. In co-operation with the Ministries of Natural Resources and Northern Affairs, tenders were called for the design, supply and installation of solar water heating systems for park comfort stations in four northern Ontario and six southern Ontario provincial parks.
5. A solar energy system designed to pre-heat the water supply at the Ontario Correctional Institute in Brampton began operation.
6. In co-operation with the Ministry of Housing, tenders were called for the design, supply and installation of a solar energy system to pre-heat the domestic hot water system in a Toronto apartment building.
7. Working through the Ministries of Agriculture and Food, and Government Services, a contract was awarded for the supply and installation of a solar energy system to heat the barns at the Arkell Swine Research Centre near Guelph.
8. In co-operation with the Ministry of Health, tenders were called for the construction of solar collectors for a \$1.3-million system to pre-heat the water at Mohawk Hospital Service, a non-profit laundry servicing hospitals in the Hamilton area.

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Renewable Energy: Substitution

1. The April 1980 Budget included an exemption of the 4.6-cents-per-litre (20.9 cents per gallon) fuel tax for alcohol when used alone or when blended with another fuel for the purpose of generating power in an internal combustion engine. The budget also included a sales tax exemption on vehicles equipped to run exclusively on fuels other than gasoline or diesel.

CONVENTIONAL ENERGY

1. The Government of Canada's National Energy Program incorporated a number of the Government of Ontario's policy positions such as a target for oil substitution by 1990, and a blended oil price mechanism to ensure an orderly transition to higher crude oil prices.

Conventional Energy: Electricity

1. The Province of Ontario, under the BILD program, has initiated an accelerated 20-year electrical generation program that includes the early completion of the Darlington Nuclear Generating Station, and the upgrading of transmission facilities, particularly to remote communities to allow local enterprises to switch from oil to electricity.
2. Ontario Hydro and municipal electrical utilities have been asked to participate in a Residential Energy Advisory Program (REAP). This program will provide homeowners with loans of up to \$2,000, along with advice on how to make their houses more energy efficient, how to convert them from oil to electrical heating, and provide for electric wiring upgrading.

3. A \$20-million special government grant allowed Ontario Hydro to reduce the 1981 cost of electricity paid by year-round rural and farm residential customers to bring the rates more in line with Hydro's municipal customers. Ontario Hydro will seek ways to reduce further the rate differential in subsequent years.
4. The Legislature approved the restructuring of Sudbury, Ottawa-Carleton and Hamilton-Wentworth Hydro Electric Commissions, with the new utilities coming into operation January 1, 1981.
5. The government received the final report of the Royal Commission on Electric Power Planning from Dr. Arthur Porter, Chairman of the Commission, and the Ministry of Energy undertook a government-wide review of the recommendations.
6. The Ministry of Energy completed a review of the Eastern Ontario Plan Stage Environmental Assessment, submitted by Ontario Hydro under The Environmental Assessment Act (1975). The ministry's review was submitted to the Ministry of the Environment as part of the overall government review.
7. Drilling continued at a research site established near Atikokan as part of the Canada/Ontario Nuclear Fuel Waste Management program. A preliminary evaluation, published in December, suggests that used fuel, when deposited in a deep geologic disposal vault, will not pose a hazard to man at any time.
8. The Ministry of Energy and the Ministry of Industry and Tourism co-sponsored The Economy, Energy and Electricity Conference which was held at the Royal York Hotel on October 14 and 15, 1980. This conference highlighted electricity as an energy form, and brought together government, utilities, industry, academic and business interests to discuss common issues.



Conventional Energy: Energy Supply/Demand

- 1. The Ministry of Energy participated in the National Energy Board's energy supply and demand hearings in order to place Ontario's views and needs in the perspective of national energy supply and demand.
- 2. The Ministry of Energy initiated discussions with the federal Energy Supply Allocation Board and other federal and petroleum industry officials with respect to the co-ordination of efforts in the event of a crude oil and petroleum products supply shortage.

Conventional Energy: Fusion

- 1. A \$250,000, five-year grant for fusion research was awarded to the Institute of Aerospace Studies and the University of Toronto. The ministry will contribute \$50,000 a year for five years.

MAJOR PUBLICATIONS

- 1. *Ontario Energy Review*, March, 1981, \$2.50
- 2. *Builders' Guide to Energy Efficiency in New Housing*, reprinted November, 1980, \$6.00
- 3. *Energy Efficiency in Municipalities: The Law*, June, 1980, Free
- 4. *Energy Efficient Community Planning Bibliography*, June, 1980, \$2.00
- 5. *Energy Efficient Community Planning — Seminar Proceedings*, December, 1980, \$2.00
- 6. *Assessment of Four Solar Domestic Hot Water Systems*, April, 1980, \$3.00
- 7. *A Solar Energy Strategy for Ontario*, October, 1980, Free
- 8. *Subdivisions and Sun*, reprinted October, 1980, \$4.00
- 9. *Perspectives on Access to Sunlight*, reprinted October, 1980, \$2.00
- 10. *Solar Energy Status Report for Ontario*, October, 1980, \$2.00



Part of the large public demand for energy information was met with increased use of displays, pamphlets and printed literature. During the fiscal year, the ministry offered a full range of communications services: from speeches and background Energy Notes, to a comprehensive advertising and conservation awareness campaign, public displays and a telephone and mail inquiry service.

Highlights

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11. *Insulation Pamphlet*, reprinted March, 1981, Free
 12. *Coal in Ontario*, September, 1980, \$2.00
 13. *Alternative Transportation Fuels for Ontario*, February, 1981, Free

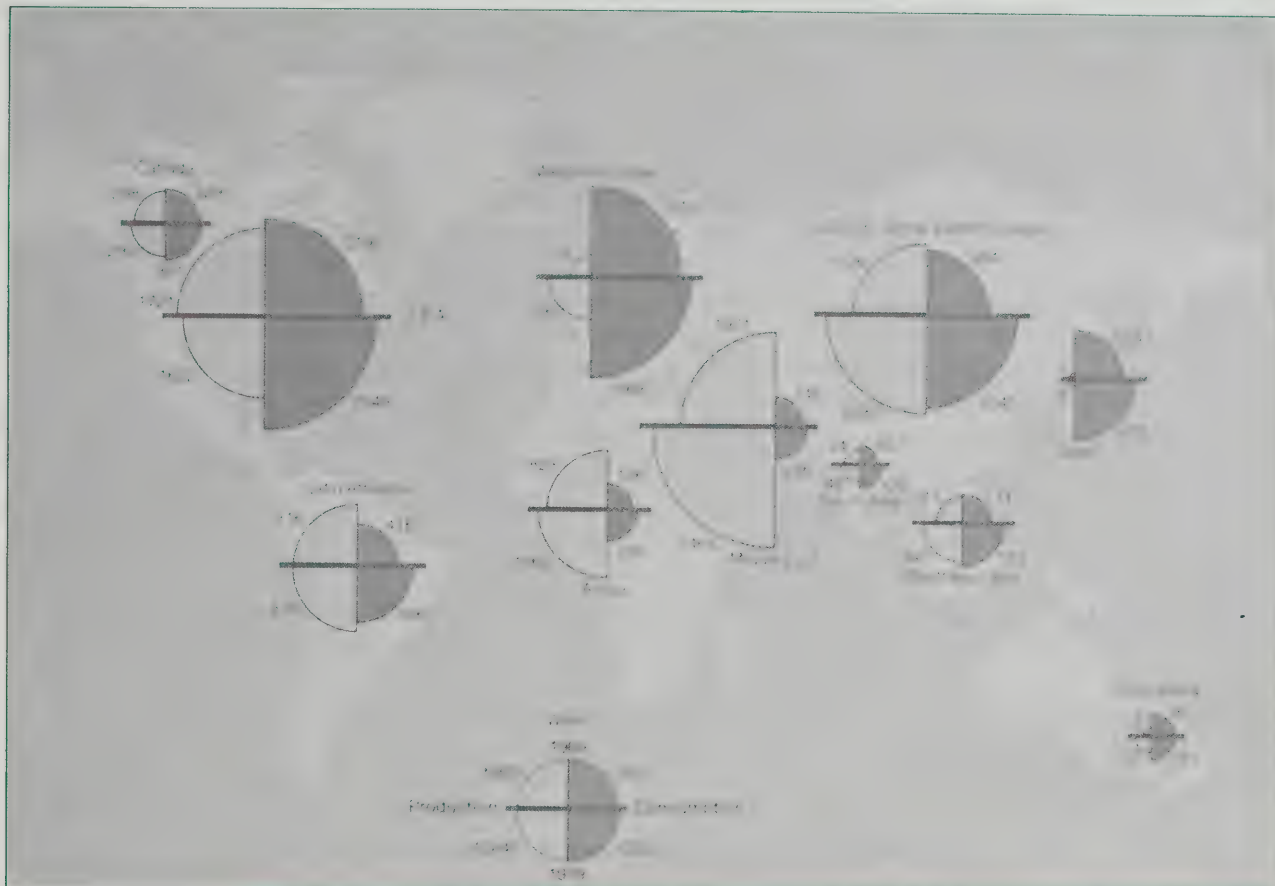
The above publications are available in person at the Ontario Government Bookstore (Main floor), 880 Bay Street, Toronto or by mail at the Ontario Government Publications Service (Fifth floor), 880 Bay Street, Toronto, Ontario, M5S 1Z8. Cheques or money orders should be made payable to the Treasurer of Ontario.

ENERGY NOTES

The ministry also has available fact sheets or Energy Notes on all its major programs. These can be obtained by writing to the Ministry of Energy at 56 Wellesley Street West, 12th Floor, Toronto, Ont. M7A 2B7.

Energy Notes available are:

1. Solar Energy: A Status Report For Ontario.
2. Energy From Garbage: A Status Report on Ontario's Energy From Waste Projects.
3. Hydrogen Energy Task Force.
4. Highlights — Ministry of Energy Initiatives April, 1980 to March, 1981.
5. 1980 Ontario Budget: Energy Highlights.
6. Energy From Lignite.
7. Energy in Education: Resource Materials, Professional Development, Student Activities.
8. Energy From Wood, Forest Waste and Tree Plantations: A Status Report.
9. Energy Conservation in Government Buildings: A Status Report on the Ontario Government's Energy Management Program.
10. Conservation in Education: A Status Report on Energy Cost Savings in Ontario's Educational Institutions.
11. Energy Prices for Space Heating: A Comparison.
12. Help for Homeowners to Conserve or Convert.



World Oil Production & Consumption 1969 and 1979 (thousand cubic metres/day)

Conventional Energy

The conventional energy program consists of the development of policies relative to crude oil, natural gas, petroleum products, coal, lignite and peat, uranium and electric power.

The objectives of the Conventional Energy Program of the Ministry of Energy are:

- to review energy matters on a continuing basis, particularly as they relate to supply, demand and transport of conventional energy resources;
- to ensure adequacy and security of conventional energy supplies at fair and reasonable

prices and with acceptable environmental impact;

- to advise the Government of Ontario on matters of conventional energy and related policy;
- to represent the government's policy position and protect provincial interests before federal and other regulatory authorities;
- to assist with the development of electric power policies within which Ontario Hydro and other agencies can carry out their responsibilities.

Conventional Energy

A Volatile and Uncertain World Oil Situation

The world crude oil picture remained volatile during 1980 with continuing troubles in the Middle East. The Iran-Iraq military conflict caused an almost total cessation of exports from these countries. This production loss was accommodated by a general softening in world demand, increased production from Saudi Arabia, Mexico and the North Sea as well as by some dwindling of very high inventories built up early in the year.

While the reduced oil production did not cause any supply crises, it did provide opportunities for further substantial price increases, averaging about U.S. \$6.00 per barrel during 1980/81. By March, 1981, the price of loading prices of major crudes ranged from U.S. \$32.00 per barrel for Saudi Arabian light to U.S. \$41.00 for Libyan, with some premiums still being applied to lower-priced crudes.

Oil Situation at Home

Canadian crude oil wellhead prices increased \$2.00 per barrel on August 1, 1980 to \$16.75 and again by \$1.00 per barrel on January 2, 1981. In addition, the Syncrude Levy, originally designed to share the cost of providing the Syncrude plant with world price for its output, was expanded into a Petroleum Compensation Charge intended to relieve the federal treasury of the cost of compensating high priced imports.

This charge, levied against all Canadian refineries, was increased in stages to \$5.80 per barrel on March 3, 1981. The last increment was \$0.75 per barrel defined as a Special Petroleum Compensation Charge relating to the cutback of Alberta crude oil totalling 60,000 barrels per day effective March 1, 1981.

Ottawa indicated that this special charge would be increased or decreased relative to the amount of the prescribed Alberta cutbacks. Combined increases in crude price and compensation

charge raised the cost of Alberta oil delivered to Toronto refineries to approximately \$24.66 compared to a wellhead price of \$17.75.

The Government of Canada's National Energy Program, (NEP), unveiled in October, 1980, introduced new policies which will result in a substantial restructuring of the Canadian petroleum industry. Among these are the encouragement of a much higher degree of Canadian participation and ownership, from both the public and private sectors, and a shift in new supply development from the traditional oil fields in the western provinces to the Arctic and eastern Canada offshore, as well as to the heavy oil sands of Alberta and Saskatchewan.

As well, an objective of the NEP is to reduce Canada's reliance on crude oil in favour of more secure forms of indigenous energy. The principle of a blended crude oil price, first proposed by Ontario in 1976, will continue. Above all, the program adopts the Ontario principle of crude oil self-sufficiency for Canada.

Ontario's policy in respect to domestic crude oil pricing has been stated on many occasions. Briefly, Ontario believes that pricing policy should:

- lead to the development of additional supplies of crude oil, natural gas and, if need be, other energy resources;
- protect the competitive position of Canadian industry;
- encourage the creation of new jobs;
- not exacerbate inflation;
- be equitable.

As noted in last year's Annual Report, Canada increased domestic production in response to the International Energy Agency's call to reduce demand for world crude oil by five per cent.

The increased production in Western Canada was expected to offset a reduction in imports, rebuild inventories and meet current demands. The so-called "cushion" of additional oil turned out to be only about half the volume



that had been anticipated, and has subsequently been reduced even further through normal depletion of the existing wells and more recently as a result of the cutbacks by Alberta.

Reluctance on the part of the petroleum industry to purchase higher priced foreign crude oil and petroleum products under the established levels of compensation offered by the Federal Petroleum Compensation Board resulted in product inventories well below the minimum desired during the spring and fall of 1979. Moderation in demand plus changes in the compensation program and competitive world pricing resulted in much improved inventory levels by the spring of 1980.

Preliminary figures for the year indicate that intake of crude oil by Ontario refineries will be somewhat lower than in 1979. The sales of motor gasoline were about the same in 1980 as in 1979.

This decline comes about despite an increase in demand, estimated in the order of two per cent of Ontario's total volume, which is attributed to American motorists purchasing gasoline at border crossings. The sale of diesel fuel was down by about one per cent while the sale of home heating oil was down by approximately four per cent.

On October 10, 1980, the Province of Ontario released a statement of policy to reduce the use of petroleum products. A target of 10 per cent maximum oil consumption was established for the residential, commercial and industrial sectors by 1990, and the target in the transportation sector was set at 10 per cent alternate fuels by 1995.

If these targets are achieved, crude oil consumption in Ontario by 1995 could be 23 million barrels lower than it was in 1980.

Recognizing Canada's and Ontario's vulnerability to changes in crude oil supply, especially in the mid-1980s, the Ministry of Energy has continued to assist the Government of Canada in the preparation of its contingency plans designed to cope with a national oil shortage. At the same time, the ministry continued to

press the Government of Canada to improve its state of operational readiness to deal with any such eventuality.

NATURAL GAS

Gas Conversions

The trend to convert to natural gas from fuel oil continued at a record level during the six month period from April to September, 1980. However, public anticipation of a federal grant program (the Canada Oil Substitution Program or COSP) resulted in a slow-down in the actual number of conversions from the expected total for the year.

During the 1979/80 heating season, there were 39,459 conversions. For the 1980/81 season, there were 41,883 conversions.

COSP was announced on October 28, 1980 as part of the National Energy Program. The announcement noted that, although the effective date was October 28, 1980 the funds would not be paid until after April 1, 1981. While conversions continued over the latter part of 1980/81, they did so at a greatly reduced rate.

It is anticipated that the combination of a widening differential of gas prices and fuel oil prices, the COSP grant, and the security of gas vis-a-vis oil will result in the rapid acceleration of natural gas conversions to levels higher than previously expected. Of the 2.9 million households in Ontario, 1.4 million have gas service.

Expansion of Ontario's Natural Gas Distribution System

Forty-eight per cent of Ontario's households are now heated with natural gas and much of its industry has access to it. Some areas of the province are not yet served by natural gas distribution lines.

As a result the ministry has been negotiating with Energy, Mines and Resources Canada during

Conventional Energy

1980/81 with the objective of expanding Ontario's natural gas distribution system.

Interventions Before the National Energy Board

In September, 1980, the ministry played a major role in the National Energy Board hearing into the Canadian energy supply and demand situation. The ministry submitted reports on Canada's crude oil and natural gas supply and on Ontario's energy requirements. A panel representing the ministry appeared before the hearing for cross-examination on the two reports.

The ministry also intervened in other hearings of the National Energy Board relating to the Foothills (Yukon) Pipelines Ltd., TransCanada Pipelines Ltd., and the Union Gas Ltd. application in order to export synthetic natural gas.

As well, the ministry intervened in the Trans-Quebec and Maritimes hearing. The ministry's position is that any extension of the TransCanada gas transmission system to the Maritime provinces must be affected under a financing and rate-setting arrangement which is both economically sound and fair to the existing customers of the system.

Coal, Lignite and Peat: Contributors to Ontario's Energy Future

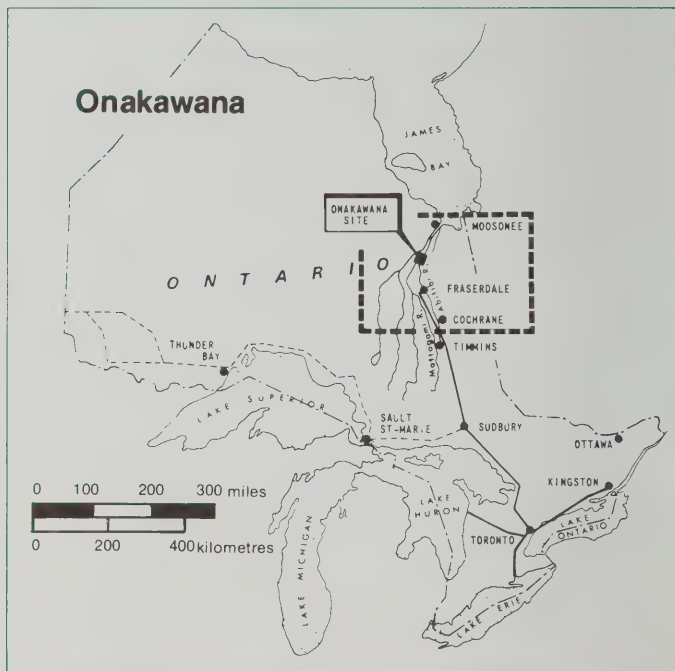
Currently, Ontario does not produce any coal and must rely on sources outside the province. However, Ontario is a major coal consumer, accounting for more than half of Canada's total consumption and Ontario is the largest export market for U.S. coal.

A report entitled *Coal in Ontario* was published in September, 1980 and provides an analysis of coal supply consumption, transportation systems and an overview of developing technology.

As part of its energy source diversification program, Ontario Hydro signed long-term con-

tracts to 1993 to purchase a total of 2.4 million tonnes a year of bituminous coal from two new mines in western Canada. A contract was also signed (1981 to 1995) for about one million tonnes annually of Saskatchewan lignite to fuel the Thunder Bay Generating Station extension.

To provide access to western Canadian coal, Ontario Hydro supported the development of a coal transfer and storage terminal at Thunder Bay. In 1980, 2.2 million tonnes of western Canadian coal passed through these facilities. The first delivery of Saskatchewan lignite is expected during 1981.



The Onakawana lignite deposit in the James Bay lowlands is Ontario's only known coal deposit. Onakawana has the heat equivalent of about 80 million tonnes of western Canadian bituminous coal which could support a 1,000 megawatt minemouth generating station.

In addition to providing fuel for an electrical generating station, dried lignite could also heat or fuel power generators in the mining and pulp and paper industries of Northern Ontario.



Exploratory excavation for lignite at Onakawana.

Lignite may also be an important part of the Ontario government’s \$75-million Alternative Transportation Fuels Program as a feedstock for methanol.

The Ontario government is actively encouraging private companies to undertake mineral exploration programs in the James Bay lowlands, either alone or in joint ventures with the Ontario Energy Corporation. The Ontario Energy Corporation has been granted a licence to explore for lignite and has completed a basic geological survey this year.

A study has been initiated to evaluate the potential of peat in Ontario for energy and non-energy uses. The study involves an inventory of peat resources and their potential in Ontario, including an evaluation of potential product lines and markets and recommendations for a development strategy.

In addition, the study will provide an evaluation of peat harvesting and processing methods and rehabilitation techniques applicable under northern climatic conditions.

**Uranium:
Ontario’s Own
Energy Resource**

By 1991, approximately half of the electricity produced in the province will be generated from uranium, resulting in significant increases in nuclear fuel requirements.

Hydro has contracts with Rio Algom Limited and Gulf Minerals Canada Limited for supplies of uranium during the periods 1971-1983 and 1980-1985.

Conventional Energy

Two additional long-term contracts with Denison Mines and Rio Algom Mines (formerly Preston Mines) have been negotiated for the delivery of about 57,000 tonnes and 33,500 tonnes respectively from the Elliot Lake area. Deliveries on the Denison contract began in 1980 and will continue until 2011; deliveries from Rio Algom (Stanleigh mine) will begin in 1984 and continue until about 2020. Starting in 1994, the full output of Denison Mines at Elliot Lake will be dedicated to Ontario Hydro.

The underground expansion was completed at the main Denison property in 1980 and the approximately 13,600 tonnes-per-day processing plant will be in place in mid-1981. The Rio Algom Stanleigh project continued to proceed on schedule.

Ontario Hydro became involved in uranium exploration projects in 1974 and currently is involved in joint ventures with Norcen Energy Resources in several provinces: Amok Limited in Saskatchewan, Shell Canada Resources Limited



The Pickering Nuclear Generating Station, located on the shore of Lake Ontario east of Toronto, is Ontario Hydro's first commercial nuclear generating station. Pickering A, consists of four 500-MW reactors (in the left foreground). The CANDU reactors at Pickering and Bruce boast the world's best performance records for nuclear generating stations. Four new 500-MW reactors (under construction, to the right of Pickering A) are expected to come into service in 1983.



in Nova Scotia and Canadian Nickel Company Limited in New Brunswick.

ELECTRIC POWER

The BILD Program

It is in Ontario's interest and the interest of this country as a whole to reduce our dependence upon petroleum — to get off-oil. It is in our interest, wherever practical, to substitute alternative fuels such as electricity for oil products.

Electricity is a secondary source of energy generated from primary sources such as coal, water-power, uranium, oil and natural gas. In the last decade and a half, the primary energy composition of Ontario's electricity production has changed dramatically.

Since 1965 Ontario's electrical energy supply has more than doubled. In that time, however, the output of Ontario's traditionally predominant source of electricity, water power, has remained relatively constant, so that the rivers and dams that provided 63 per cent of Ontario's electrical power in 1965 now account for only 36 per cent of the total.

In 1965, less than one quarter of Ontario's electricity was thermally generated from coal, oil or natural gas. By 1979, conventional thermal output had tripled, so that coal (with very small amounts from oil and natural gas) produced about 29 per cent of the province's electrical supply.

In the 1970s, the most important development was the introduction of nuclear-powered (uranium) thermal generation. Uranium-based electricity has expanded rapidly in the last several years until in 1979 about 29 per cent of the province's electrical supply was produced by that means.

Electricity, and electricity produced from nuclear power, is clearly an important component of Ontario's energy policy.

On January 27, 1981, Premier William Davis announced the Building Ontario in the 1980s Program which outlines policy direction and specific initiatives developed by the Board of Industrial Leadership and Development (BILD), a new committee of Cabinet. Its aim is to promote industrial expansion for the province.

The BILD program is designed around six major themes: electricity, transportation, resources, technology, people and community.

BILD projects and development programs will require investments estimated at \$1.5 billion to be shared by the three levels of government and the private sector.

The BILD strategy will prepare Ontario for a transition to an economy based increasingly on electric power.

The provincial electrical system will be utilized, wherever practical, to substitute for crude oil, thereby complementing the national off-oil initiatives.

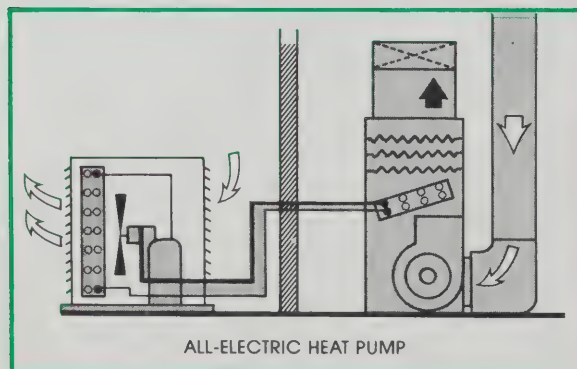
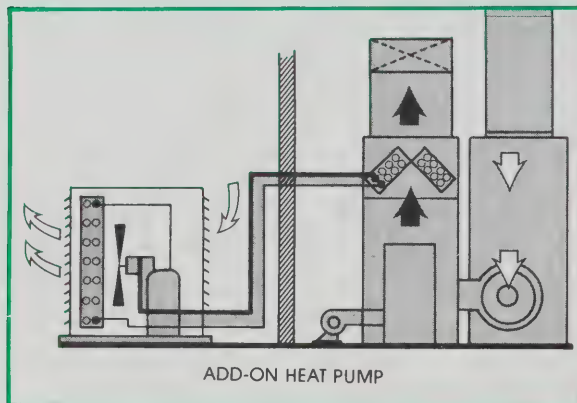
Among the initiatives identified in BILD which directly involved the ministry are:

- a 20-year electrical generation program, including an acceleration in the completion schedule of Ontario Hydro's Darlington nuclear station;
- the determining of appropriate levels of generating capacity from nuclear, hydraulic and other indigenous sources to be determined, so that pollution, fuel costs and Ontario's use of imported coal can be reduced;
- the construction and upgrading of transmission and distribution facilities, as well as the development of small-scale hydraulic generation, to provide electricity in remote communities;
- in conjunction with Ontario Hydro, the planning of strategies for the efficient and prudent use of electricity. These measures will primarily be oriented to the commercial and industrial sectors, and will encourage off-peak use of electricity and thermal storage.

Conventional Energy

Homeowner Loan and Assistance Program

As announced by Premier Davis on March 2, 1981, the government will introduce legislation authorizing Ontario Hydro and the municipal electrical utilities to undertake a residential electrical service program. This program will provide homeowners with information and advice on electrical safety and upgrading, energy conservation, heating and cooling equipment including heat pumps, electrical system improvements, water heating, electrical wiring upgrading and a home energy audit. A \$2,000 loan program will be established to help homeowners implement Hydro's advice.



Above illustration courtesy of Ontario Hydro

A heat pump is an electrically-operated device that extracts heat from one place and moves it to another. In winter, a heat pump extracts heat from the outside air and moves it into the house. In summer, it pumps excess heat from the house to cool the living quarters.

The government, in conjunction with Ontario Hydro, is also planning strategies for the efficient and prudent use of electricity. These measures will primarily be oriented to the commercial and industrial sectors and will encourage off-peak use of electricity and thermal storage.

Electric Power Planning Final Report

The *Final Report of the Royal Commission on Electric Power Planning* was released on March 26, 1980. The government's review and response to the report is being co-ordinated by the Ministry of Energy.

Load Forecast and Construction Program

On January 16, 1981, Ontario Hydro announced its 1981 long-range load growth forecast. This predicted growth in consumer demand of an average 3.1 per cent per year to the year 2000 is down from the 1980 forecast of 3.4 per cent. Ontario Hydro management is assessing the implications of the changed forecast for the generation construction program.

Ontario Hydro will accelerate the completion of the Darlington Nuclear Generating Station and, in conjunction with the government, will determine appropriate levels and types of additional generating capacity to meet Ontario's future needs.

Hydraulic Development Encouraged

The Ministry of Energy is developing a policy in conjunction with the Ministry of Natural Resources to encourage the further development of hydraulic generating capacity where socially and environmentally acceptable.

A hydraulic site is measured according to its average energy capacity:

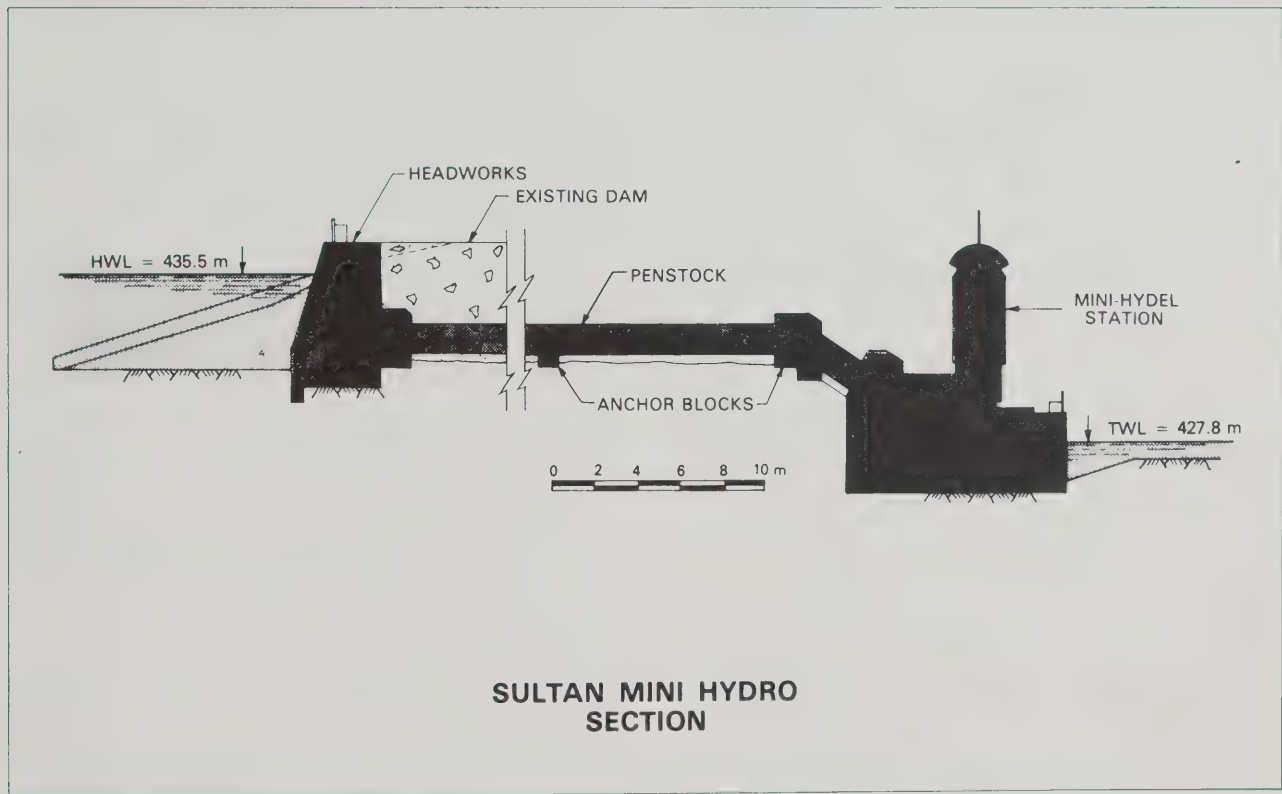


- micro less than 100 kilowatts
- small from 100 kilowatts to two megawatts
- medium and large more than two megawatts

The Ontario Cabinet has approved a policy for the development of small and micro-hydraulic

sites. It puts Ontario Hydro, private developers and public utilities on an equal basis when they seek permission to develop a small or micro-hydraulic site. The aim is to encourage private developers and others to assess the many smaller hydraulic sites throughout the province.

A micro-hydro booklet, prepared by the ministry with the assistance of Ontario Hydro,



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provides information to individuals interested in water power. It includes topics such as the government approval process, equipment manufacturers, costs and economics. This booklet will be published in the spring of 1981.

A Mini-Hydel (small hydraulic generator with applications that could include the servicing of small, isolated communities now dependent on fossil fuel electrical generators) has been installed at Sultan.

Plans are being finalized to demonstrate a number of micro-hydraulic generators around the province.

Environmental Assessments

In July, 1980, Ontario Hydro filed an environmental assessment with the Ministry of the Environment on its Eastern Ontario Transmission Plan.

The existing bulk power transmission facilities in Eastern Ontario are considered to be inadequate to supply future load reliably. As well, there is a need to expand Ontario Hydro's interconnection capacity with Hydro Quebec.

Ontario Hydro is seeking approval for a system plan, an associated route-stage study area, and an outline of its future activities leading to an application by Ontario Hydro for route stage approval under The Environmental Assessment Act.

At the request of the Ministry of Energy, through the Ministry of the Environment, Ontario Hydro provided supplementary information in November, 1980 on interconnections with Hydro Quebec.

On January 26, 1981, the Ministry of Energy submitted its review of the plan to the Ministry of the Environment. The overall government review had not been completed by the end of the fiscal year.

Rate Assistance to Rural Customers

In April, 1980, Premier William Davis requested, through the Minister of Energy, that Ontario Hydro study ways of reducing the differential paid by residential customers of Ontario Hydro's rural system, as compared to municipal utility customers.

On November 13, 1980, the Ontario Treasurer announced a \$20-million grant to Ontario Hydro to provide assistance for rural residents in 1981. At the same time, the government instructed Ontario Hydro to reduce the differential further by 1982.

The Ontario Hydro report, prepared at the Premier's request, was tabled in the Legislature by the Minister of Energy on November 24, 1980. A decision will be made this coming year on the nature and method of reducing the differential beyond 1981.

Discussions are also being held among government, Ontario Hydro and customer representatives on the longer-term program to reduce the undue differential.

1981 Bulk Power Rates Increased

On April 30, 1980, the Chairman of Ontario Hydro submitted a proposal to the Minister of Energy to increase 1981 bulk power rates to municipal hydro utilities and direct industrial customers.

The Minister referred the proposal to the Ontario Energy Board (OEB) for review. In July, 1980, the OEB held a 14-day public review of Hydro's proposed 9.4 per cent increase in bulk power rates for 1981.

In its report, the OEB confirmed Hydro's proposal for the 1981 rate increases. At its October meeting, the Ontario Hydro Board of Directors approved the 1981 bulk power rates that resulted in average increases of 9.3 per cent for municipal utilities and 9.6 per cent for direct industrial customers.



Electrical Costing and Pricing Review

The Ontario Energy Board (OEB) submitted its final report on electricity costing and pricing principles to the Minister of Energy on December 20, 1979.

In January, 1980, Ontario Hydro announced a program of consultation with its customers to review both the OEB's recommendations and the changes which might be implemented. Then in May, 1980, Ontario Hydro approved a draft framework of costing and pricing objectives and policies which it forwarded to its bulk power customers for discussion.

At the request of some bulk power customers and their representative associations, the Ontario Hydro Board of Directors decided in December, 1980 to defer the implementation of any revisions for one year to allow for further discussion with its customers. This process will continue through July, 1981.

The current schedule calls for the ultimate incorporation of changes in costing and pricing principles in the 1983 bulk power rates.

The Ministry of Energy has participated in the entire process and has closely monitored the actions and progress of Ontario Hydro.

Municipal Hydro Restructuring

The major restructuring of local government in the early 1970s and the establishment of many new municipal boundaries created a need to examine retail electrical distribution jurisdiction.

William Hogg of Sault Ste. Marie was appointed chairman of a committee to study municipal hydro restructuring for both regions and restructured counties in 1973. Two years later, the Hogg report was tabled in the Legislature and adopted as a guideline for local study groups.

At the same time, a provincial steering committee on municipal hydro restructuring was

set up to co-ordinate the local studies in accordance with the provincial guidelines. In addition, the committee was to provide an organization for reviewing and implementing these local studies.

Since that time, restructuring studies have been initiated in ten regions and counties. Legislation has been enacted and restructuring has taken place for the following regional municipalities: Waterloo and Peel (July, 1977); the County of Oxford (December, 1977); York (June, 1978); Niagara (May, 1979); Halton and Durham (June, 1979); Hamilton-Wentworth (June, 1980); Ottawa-Carleton (June, 1980); and Sudbury (November, 1980).

As a result of the legislation passed during 1980/81 for Sudbury, Hamilton-Wentworth and Ottawa-Carleton, 17,280 former Ontario Hydro customers have been transferred to the new utilities.

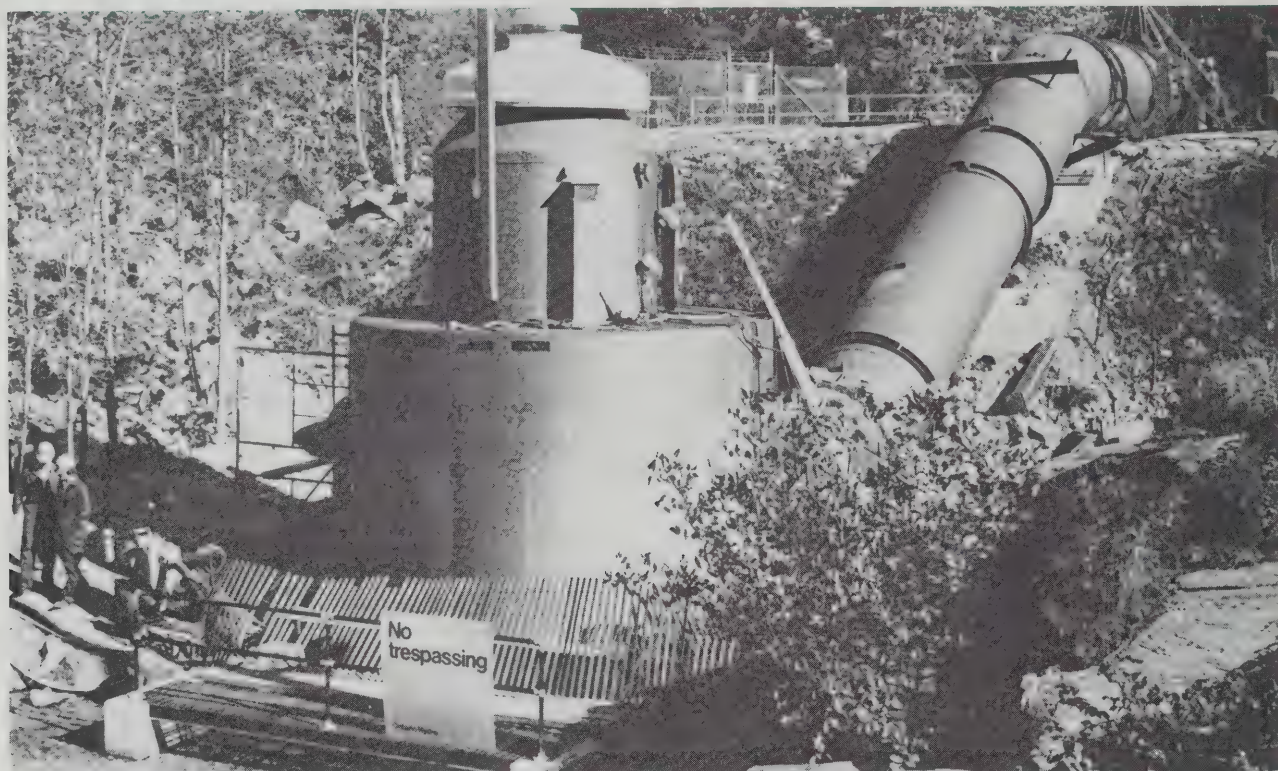
Electrification of Remote Communities

Electric power is being made available in certain Northern Ontario communities not currently served by the Ontario Hydro transmission and distribution grid system. This is done under a \$3-million program for the Electrification of Remote Northern Communities which was announced on December 15, 1976.

This program is carried out by Ontario Hydro using local diesel generation, small hydraulic generation, or extensions to existing transmission lines where appropriate initial capital costs are paid by the government.

Since 1976 five communities — Hillsport, Oba, Armstrong, Biscotasing and Sultan — have received the benefits of dependable electricity. Another three communities — Collins, Audin and Ramsay — are being surveyed for inclusion over the next two years.

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The Wasdell Falls Mini-Hydel Station during installation in 1980. The site is located on the Severn River, about 150 km north of Toronto.

Electrical Usage by Apartment Dwellers Studied

In June, 1976, the legislative Select Committee examining Ontario Hydro's bulk power rate increase, recommended that all new multi-unit residential buildings be individually metered and that existing bulk metered units be retrofitted.

A joint study, initiated by Ontario Hydro, the Ontario Municipal Electric Association, and the Association of Municipal Electrical Utilities, investigated the energy and dollar benefits and disadvantages of bulk metering for new construction.

Following more than a year of study, the final report of the Tri-Party Committee on Electrical Metering was tabled in the Legislature on December 15, 1977. Copies of the report were sent to a number of groups and individuals for comments.

Because of rapid advances in technology and some doubts that individual metering in all cases was the best solution, an Electrical Energy Management Strategy (EEMS) study was established in September, 1980 under the sponsorship of a task force including representatives from the Ministry of Housing, Ontario Hydro, the Association of Municipal Electrical Utilities and the Ministry of Energy. This study is to determine the feasibility of limiting the consumption of electrical energy within apartment buildings through electrical energy and demand management.

The task force had not completed its deliberation at the end of the fiscal year.

Based upon analyses of the tri-party committee's recommendations, the reaction of various interested groups, and the EEMS study, it is expected that a policy on methods of electrical metering will be established in 1981.



Nuclear Fuel Waste Management Agreement

The ministry is a member of the Canada/Ontario Co-ordinating Committee on Nuclear Fuel Waste Management, set up under the June 5, 1978 agreement between the Governments of Canada and Ontario.

Under this agreement, Atomic Energy of Canada Ltd. (AECL) is the lead agency for the development of a method for the disposal of radioactive nuclear reactor fuel wastes.

AECL continued work on the feasibility of using granite rock formations for the permanent disposal of nuclear fuel wastes through research drilling at Atikokan, Ontario, and at its own laboratory site at Pinawa, Manitoba.

A preliminary analysis of the long-term impacts of such a disposal facility was reported in AECL's Second Annual Report of the Canadian Nuclear Fuel Waste Management Program, published in December, 1980. AECL concluded that used fuel from Canada's nuclear reactors, when disposed of in a deep geological disposal vault, would not pose any significant hazard at any time.

Select Committee on Ontario Hydro Affairs

The Select Committee on Ontario Hydro Affairs was established by the Legislature in November, 1977 to examine a wide range of matters including an examination of Ontario's nuclear commitment. The nuclear phase of the Select Committee's work started in 1978 and resulted in the production of three final reports in 1980.

a. The Safety of Ontario's Nuclear Reactors

After an extensive series of hearings the Select Committee concluded that CANDU reactors built and operated in Ontario are acceptably safe.

b. The Management of Nuclear Fuel Waste

Between January and March of 1980, the Select Committee held six weeks of extensive hearings on nuclear fuel waste management.

In June, 1980, the committee released the *Final Report on the Management of Nuclear Fuel Wastes*. Although this report was not debated in the Legislature, it was the subject of a statement by the Minister of Energy on December 12, 1980.

c. Final Report on Uranium Tabled

On July 8, 1980, the Select Committee started an 11-week-long hearing on the mining and refining of uranium ore. In December, 1980, the *Final Report on Mining, Milling and Refining of Uranium* in Ontario was tabled in the Legislature.

On January 6, 1981, the Select Committee resumed its hearings. In this phase, the committee began to examine Ontario Hydro's system planning concepts including a review of the 1980 System Expansion Program document, the remaining hydroelectric potential in Ontario, transmission line problems, comparisons between nuclear and fossil generation, industrial cogeneration and conservation.

The ministry made a presentation to the committee on January 27, 1981, concerning government policy on hydraulic development. The last hearing was on January 29. The committee was dissolved upon the calling of the provincial election.

Credit, Collection and Cut-Off Guidelines

In 1978, a task force of public utility associations helped the Ministry of Energy prepare a set of voluntary guidelines to improve the residential credit, collection and cut-off practices of public utilities in Ontario.

This task force was comprised of representatives of the Ontario Natural Gas Association,

Conventional Energy

Ontario Municipal Waterworks Association, Metro-Toronto Waterworks' Utilities, Ontario Hydro, Ontario Municipal Electric Association and the Association of Municipal Electrical Utilities.

On November 20, 1978, these guidelines were tabled in the Legislature by the Minister of Energy and were sent to the utilities for their consideration and adoption.

In May, 1980, the Deputy Minister of Energy requested the co-operation of the utility associations in determining the effectiveness and extent of the adoption of the voluntary guidelines.

Arrangements were made to use the facilities of the Association of Municipal Electrical Utilities to co-ordinate a questionnaire prepared by the ministry and to review and analyse the response. Approximately 365 questionnaires were mailed out and a preliminary analysis of the replies was provided in September.

The ministry is reviewing the survey results and is discussing them with the utility associations.

Parallel Generation

With advice from Ontario Hydro, the ministry was involved in developing policy on the use of parallel generation (including industrial cogeneration) in Ontario. During 1981, the ministry will be working with Ontario Hydro to ensure that the policies ultimately approved by the government are reflected in rates and conditions of service for parallel generation being developed by Ontario Hydro.

NEB Decision Expected Soon on Electricity Exports

On June 30, 1980, Ontario Hydro applied to the National Energy Board for approval to export electricity under the National Energy Board Act. Ontario Hydro is applying for:

- a licence to replace an existing licence for the period of July 1, 1981 to December 31, 1995 to permit the unscheduled exchange of

circulating power and energy to a limit of 10 million MWh of inadvertent power and energy in any consecutive 12-month period. The present amount is 8 million MWh in any 12-month period.

- a new licence to replace an existing licence for the period of July 1, 1980 to June 30, 1991 to permit the export of interruptible power and energy to a maximum of 25 million MWh in any 12-month period. The limit in the present licence is 15 million MWh in any 12-month period.
- a new licence to permit the scheduled export, on a firm basis, of miscellaneous blocks of surplus power and energy for terms of six months to five years during the period July 1, 1981 to June 30, 1991 to a maximum of 1,200 MW in any 12-month period.
- a certificate to authorize the changes and modifications to existing structures and operations pertaining to the raising of the operating voltage level of the existing two transmission lines between Niagara Falls, Ontario, and Niagara Falls, New York, to 345 kV.

The National Energy Board hearing commenced on March 17, 1981. The ministry reviewed the Ontario Hydro proposals and prepared an intervention in support of them. The board decision is expected before June 30, 1981.

Ministry Funds Fusion Research

The Ministry of Energy continued to support research and development activities related to fusion in the area of materials and engineering.

A \$250,000 grant, extending over a five-year period, was made to the University of Toronto Institute for Aerospace Studies to continue studies on the resistance of materials to surface attack by atomic hydrogen. In addition, a one-year grant was made to McMaster University to investigate the discharge pumping efficiencies of two pumping systems for CO₂ lasers.

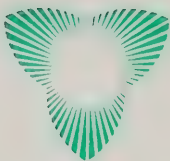


Photo by Jack Chiang, The Kingston Whig-Standard.

The lad's "human power" is a fine example of the Ministry of Energy conservation message in action.

The conservation of energy represents, in the short term, the most significant potential for achieving the province's goals of reducing growth in energy demand and increasing security of energy supply.

While new and renewable energy forms undergo development, energy conservation extends conventional energy supplies and provides the time necessary to develop viable alternatives.

During the fiscal year, existing energy conservation programs continued to have an impact on all sectors of Ontario's economy, encouraging conservation through various services ranging from direct financial assistance to information on the latest energy-related technological developments and conservation opportunities.

Major new programs and demonstration projects were also initiated.

Energy Conservation

Financing Technology: the Bilateral Agreement

A five-year, \$58-million federal-provincial bilateral agreement signed in May, 1979 cost-shares the demonstration of innovative technologies in energy conservation and renewable energy with the private sector.

Under this agreement, projects are being undertaken to promote the development of technology and its widespread acceptance in areas such as energy-efficient building design, transportation, energy from waste, district heating and solar energy.

While Ontario administers the program, the Governments of Canada and Ontario share the public sector costs of projects equally. In addition, private sector participants assume a significant portion of the costs.

Priorities for funding allocation have been set in each sector (residential, commercial, industrial, transportation) and are geared to conservation and substitution for crude oil.

Projects large and small are considered as long as they can generate a reduction in energy use or substitute a renewable energy resource; have good potential for implementation without further assistance following successful demonstration; and are well-documented proposals that specify anticipated benefits and the target market.

During the past year, the program was promoted federally and provincially through advertisements, brochures, direct mail and special meetings with interested groups in industry and commerce.

At the conclusion of the fiscal year, 23 projects, with government funding in excess of \$8 million, were identified for approval. A further 48 projects are under review.

Demonstration projects initiated in fiscal 1980/81 included:

- passive solar heat in 20 energy-efficient homes;
- solar-assisted domestic hot water systems;
- wind-diesel hybrid power generators for remote communities;
- waste wood gasification for process heat supply to plywood mills;
- sap concentration by reverse osmosis for the production of maple syrup (reverse osmosis systems act like filters to remove three-quarters of the water from the raw sap and reduce by two-thirds the amount of fuel oil needed to make maple syrup);
- a residential hot water district heating system;
- computerized traffic signal systems for small cities.

When the projects now underway are completed, the energy saved by Ontario would be enough to heat approximately 100,000 homes. As the new and innovative ideas are adopted as a result of these initial demonstrations, the potential energy savings could have a very significant impact for this province.

Projects now under review cover a wide range of technologies. They include: the potential of substantial energy savings through utilization of water-source heat pumps; innovative and cost-effective construction and environmental control elements for greenhouses; the benefit of co-generation of steam and electricity in an industrial plant; and the development of equipment and systems such as an automatic shutoff for highway transports and fuel-use monitoring equipment to reduce fuel consumption in private or commercial vehicles.

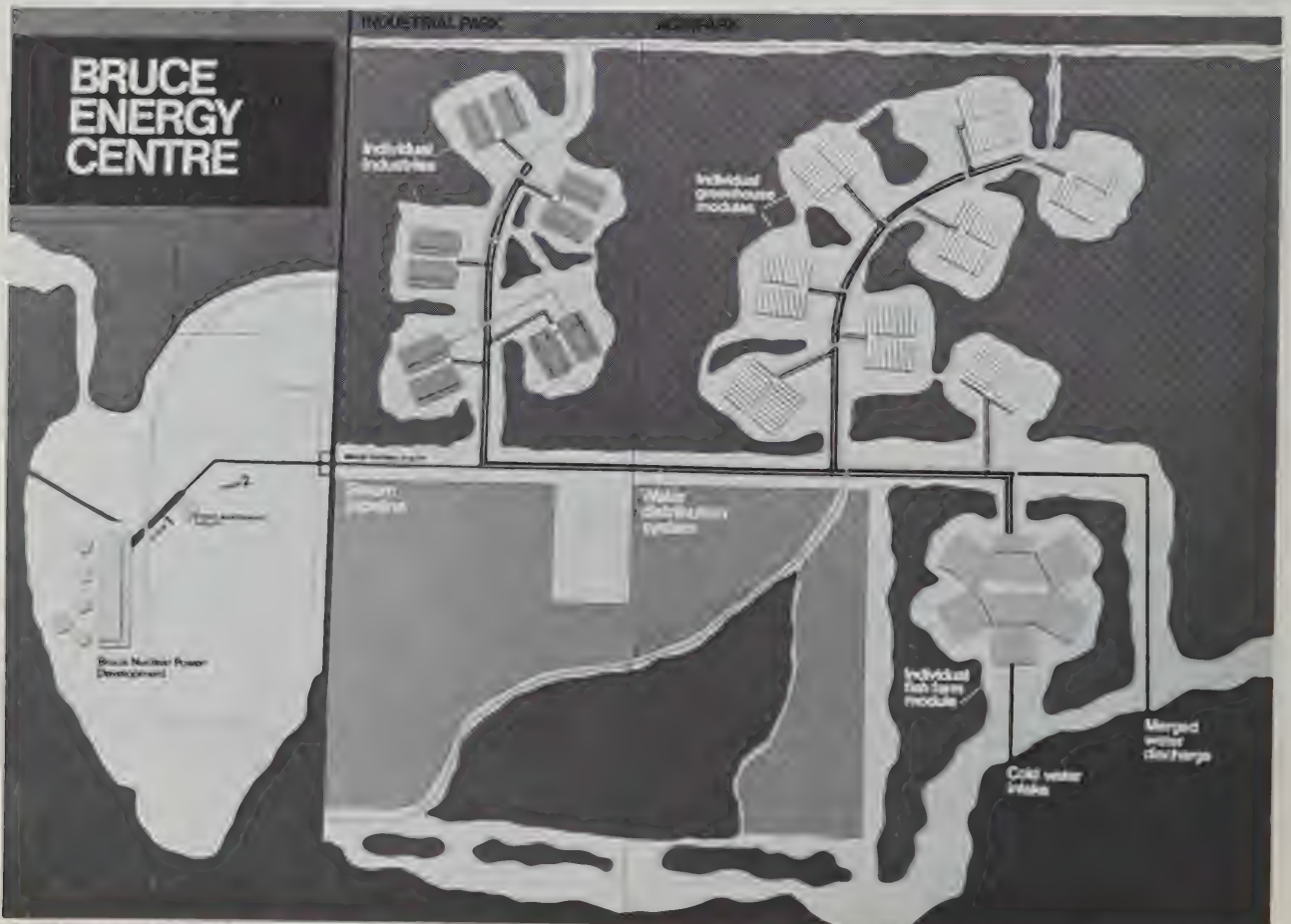


Orillia was one of 11 communities visited in the fiscal year as part of the ministry's five-year, \$4.9-million Heat Save residential energy conservation program. In these photos, homeowners are examining thermograms of their homes with a project officer to discover if there is any heat loss. Thermograms are aerial "heat pictures". Dark shades indicate areas in which homes are adequately insulated, while lighter shades show where heat is escaping.

THE BRUCE ENERGY CENTRE:



Ontario Hydro's energy megaproject, the Bruce Nuclear Power Development, south of the Bruce Peninsula on Lake Huron. The Bruce "A" plant in right foreground is capable of supplying about three million kilowatts to the Ontario electrical grid, nearly a fifth of the province's power requirements on the busiest day of 1980. The towers in the middle are the heavy water plants which supply the reactors with moderating and cooling water. In the background at top left is the Bruce "B" plant which will double the station's output as its four reactors come into service between 1983 and 1987.



The Ontario Energy Corporation, an agency of the Ontario government, along with private sector partners plans to use steam from the Bruce Nuclear Power Development to provide power for an industrial and agricultural park adjacent to the nuclear station.

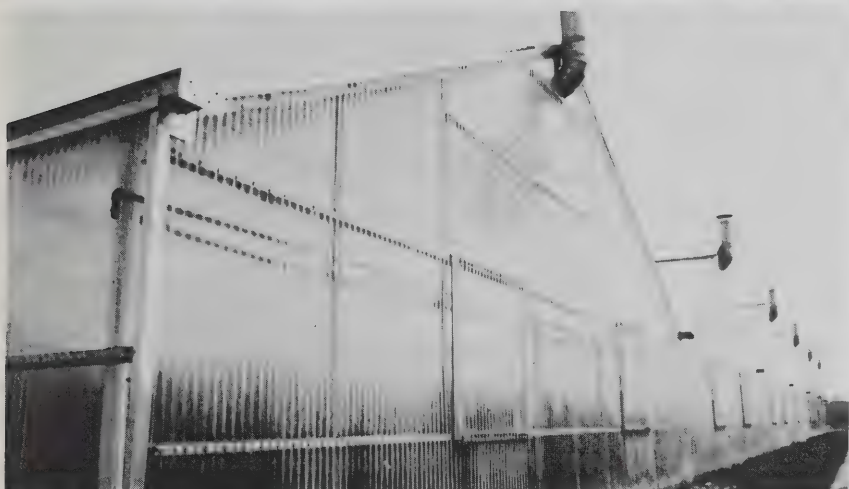


A NEW ENERGY OPPORTUNITY FOR ONTARIO

BRUCE AGRIPARK

phase 1: productivity test

a joint venture of...
huron ridge ltd. • anderson flax products ltd. •
the consumers' gas co. • weston energy resources ltd. •
transcanada pipelines ltd. • ontario energy corp. •



The Bruce AgriPark is a key component of the Bruce Energy Centre. An AgriPark demonstration project was initiated in 1980 at a one-acre prototype greenhouse using a boiler system to simulate various temperatures available from the Bruce nuclear station. This allows researchers to demonstrate greenhouse designs and growing techniques as well as testing local climatic conditions.

Energy Conservation

CONSERVATION BEGINS AT HOME

The Heat Save Program

Because it brings every conservation directly to the consumer, **Heat Save** is a highly visible and very important component of the ministry's efforts to conserve energy. The equivalent of 20 million gallons of fuel oil could be conserved annually through energy conservation actions by at least 175,000 homeowners.

Heat Save uses aerial thermograms or "heat pictures" which show each home and building in the community. The grey and white shadings on a thermogram of a roof relate to the performance of insulation in the attic or spaces below the roof.

By reading the thermogram, a trained thermography interpreter can determine whether or not the attic or roof insulation is doing the proper job. Other areas of heat loss identified on the thermogram can indicate "heat leaks" around the insulation. All too often, insufficient attic ventilation or an inadequate vapor barrier is detected.

By making this knowledge available to homeowners, they are able to take advantage of the potential savings which can be made through better insulation, adequate roof ventilation and a proper vapour barrier.

Over a three-year period, commencing in 1977, the ministry undertook a series of pilot projects using aerial thermography as a basis for homeowner conservation information.

As a result of the experience gained from the pilot projects, the ministry launched a five-year, \$4.9-million **Heat Save** energy conservation program in March, 1980.

Sixty-four urban centres (with populations in excess of 9,000) were selected for **Heat Save**. The order in which they are visited is based on such factors as age of the housing stock and dependence upon oil.

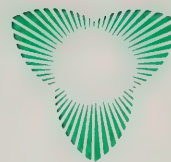
During the fiscal year, **Heat Save** visited the following 11 communities:

	Percentage of Homeowners in Attendance
Sault Ste. Marie	34
Sudbury	39
Belleville	40
Pembroke	45
Brantford	37
St. Thomas	48
Orillia	48
Midland/Penetanguishene	47
Brockville	43
Port Hope	52
Cobourg	65

At **Heat Save** clinics, homeowners were invited to spend about 20 minutes with a trained project officer to have the thermogram showing their residence interpreted for heat loss. The same project officer provided information on practical steps to improve the home's insulation and other thermal characteristics, as well as the approximate costs involved and the annual fuel saving which could be expected from these energy conservation steps.

Homeowners were sometimes surprised to find that the effectiveness of their insulation was reduced by trapped moisture. This arises when insufficient attention is paid to improving vapour barriers or increasing attic ventilation at the same time that levels of insulation are increased.

The ministry continued to monitor consumer attitudes towards **Heat Save** and found more than 90 per cent public endorsement of the program. Studies by the ministry show that if the insulation levels for all existing housing in Ontario were increased to the present building code standards wherever possible, homeowners could save up to one-quarter of their heating costs.



Homes of the Future: More Energy Efficient

The *Builders' Guide to Energy Efficiency in New Housing*, jointly released in January, 1980 by the Ministry of Energy and the Housing and Urban Development Association of Canada (HUDAC), was an instant success and is now in its second printing.

The guide is designed to assist the home-building industry in designing and constructing energy-efficient homes. It is aimed specifically at builders of low-rise housing — single family dwellings, townhouses, duplexes and three-storey walk-up apartment buildings — the most prevalent form of new housing today. The guide offers methods of improving the thermal performance of building shells and heating systems. It also indicates the capital costs and payback periods of the various improvement options. The methodology was applied in the passive solar housing design project described later in this report.

In the final stages of preparation are a homebuyer's guide and a homeowner's guide. These two publications will also be released jointly by the ministry and HUDAC in spring/summer, 1981, and will provide self-help guides for the consumer who wishes to buy and maintain an energy-efficient home.

The ministry continued to work with the Ministry of Consumer and Commercial Relations to upgrade the Ontario Building Code to reflect current requirements for energy conservation in construction. The revised code should be in force by the end of the year.

Under a program sponsored in part by the Ministry of Energy, the Canadian Gas Research Institute (CGRI) completed development of a new gas-fired, high-efficiency condensing furnace. Designed for residential use, the forced warm air furnace condenses water vapour from the fuel gases in order to capture useful heat energy previously lost up the chimney.

The new furnace can achieve a seasonal operating efficiency as high as 95 per cent, representing up to 65 per cent improvement over conventional oil or gas-fired units. It eliminates the need for a chimney, requiring only a simple exhaust vent through the outside wall.

Licensing rights for manufacture of the high-efficiency condensing furnace have been arranged. Production models are now available and are attracting response from both builders and owners.

EDUCATION

Bringing Energy Issues to Ontario's Classrooms

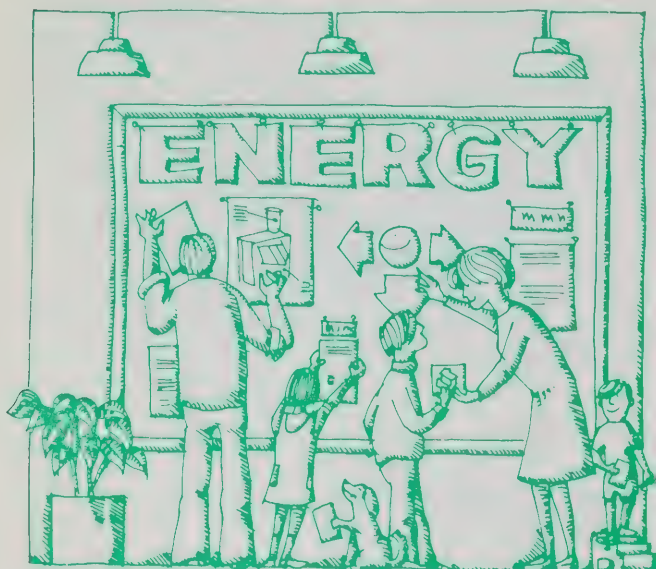
The ministry's energy education program for teachers and students moved ahead during fiscal 1980/81 in four key areas: professional development, curriculum development, teaching aids and outreach activities.

Since 1977, the Ontario Ministry of Energy, in co-operation with the Ministry of Education and the Ontario Teachers' Federation, has provided leadership in energy education in Ontario to support teaching activities across the province.

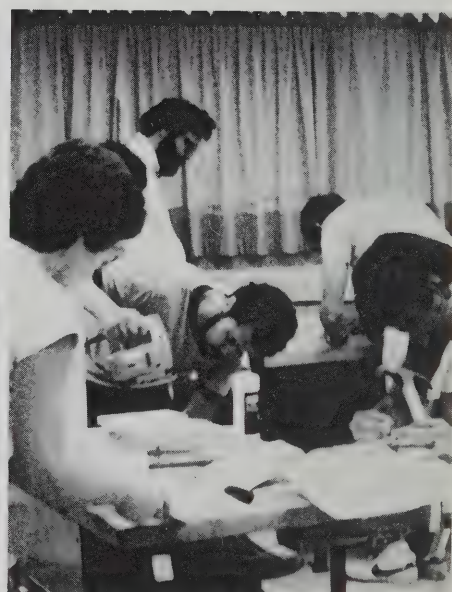
The program goal is to assist teachers to deal knowledgeably and objectively with energy issues in the classroom. The program is co-operative by nature and is complemented by a growing network of interested teachers across Ontario who voluntarily commit their time and efforts to energy education.

Professional Development

For the second year, a three-week summer energy seminar and evaluation workshop was held for teachers of grades four to six. As an official board representative and resource person on energy education, each teacher assumes responsibility for passing along newly acquired skills to his or her colleagues at the local level.



Energy in Education



The Ministry of Energy, in co-operation with the Ministry of Education and the Ontario Teachers' Federation, encourages and supports the teaching of energy topics in Ontario classrooms. Teachers attended summer seminars in Thunder Bay and Peterborough to discuss methods of teaching energy issues. An evaluation workshop of the sessions was held in Toronto in the winter.



The first week of the seminar was held in Toronto where all aspects of energy — its sources, uses, forms and methods of conservation — were discussed. For the remaining two weeks, teachers met at Laurentian and Trent Universities to discuss approaches to teaching energy issues.

An outgrowth of the professional development program has been the creation of Energy Educators of Ontario (EEO), with more than 100 teachers as members to date. EEO is a volunteer network of teachers who want to share information on energy education and promote the teaching of energy issues as part of the Ontario school system's existing curriculum. With the assistance of the ministry, EEO held a two-day energy conference in May, 1980, which was attended by 150 teachers.

Also in the fiscal year, two editions of *Energy Alert*, EEO's newspaper, were published and distributed province-wide, along with four energy conservation starter kits for teachers, with the ministry providing financial and technical assistance.

EEO will continue to be a vital link between the ministry and the teaching community. It is currently planning an annual meeting this spring to discuss and evaluate the efforts of the past two years.

Curriculum Development

Work continued on *Energy in Society — Part Two* (a curriculum guide for teachers — intermediate level) which is scheduled for publication this fall. Six of the 15 booklets in the *Curriculum Ideas for Teachers* series were published and distributed to primary and junior teachers across the province. These initiatives were developed by the Ministry of Education with financial and technical support from the Ministry of Energy.

In addition, the Ministry of Energy continued its consultation with Ontario Hydro on its education program, providing advice on Hydro's teaching materials.

Teachers Provide Essential Input

As a result of a teacher opinion survey, the ministry adopted a multi-year plan to produce teaching aid materials on energy. An energy film and a series of educational posters are scheduled to be produced for the fall of 1981, with teachers providing consultation and advice at each step of development. This material will provide both teachers and students with classroom-ready information on energy.

Outreach Activities

The ministry also provided hundreds of teachers and students with energy information during the year, and participated in professional development activities on energy in St. Catharines, Ottawa, North Bay, London and Toronto.

TRANSPORTATION

Ministry Focuses on Transportation

The transportation sector (automobiles, trucks, aircrafts, trains, buses and other vehicles) accounts for about half of Ontario's crude oil consumption.

For this reason, the ministry focused particular attention on the transportation sector as part of its October 10-point energy conservation and oil substitution announcement. (See section on the Alternative Transportation Fuels Program for details).

Energy Conservation

In addition to this major program announcement, there were a number of important initiatives in the transportation area in the past year.

The focal point of all activities is the ongoing Transportation Energy Management Program (TEMP), a joint undertaking of the Ministry of Energy and the Ministry of Transportation and Communications. TEMP's goal is a 10 per cent reduction in energy consumption in the transportation sector by 1985. This goal complements the long-range transportation energy-efficiency objectives announced in October, 1980.

TEMP continued to concentrate on five major areas:

- improving the energy efficiency of transportation technology;
- improving the energy efficiency of operations;
- using more efficient modes of transportation;
- developing alternatives to oil; and
- reducing the need for travel.

To achieve these goals, TEMP operated six major programs during fiscal 1980/81. These included:

- Municipal and Intercity Program;
- Drivesave;
- Trucksave;
- Ridesharing;
- Drive Propane;
- Teleconferencing.

Municipal Transportation

To encourage transportation fuel conservation by Ontario Municipalities, a Municipal Transportation Energy Advisory Committee was formed in March, 1980. Committee membership includes technical staff from municipalities, operating agencies, the Ministry of Transportation and Communications and the Ministry of Energy. The activities of the Transportation Energy Advisory Committee are closely co-ordinated with

the Joint Steering Committee on Municipal Energy Conservation, which encourages municipalities to undertake voluntary energy conservation programs.

The advisory committee launched a series of nine seminars throughout the province to inform municipalities of possible energy conservation measures and to illustrate the benefits of van pooling and public transit. A comprehensive survey of transportation energy management options was completed and a municipal energy conservation manual was initiated. The manual will be published this year.

Personal Driving Habits CAN Make the Difference

It has been estimated that energy savings within the range of 10 to 25 per cent could be realized through improved operator behavior related to driving, vehicle use and vehicle maintenance.

Under **Drivesave**, assessments were made of energy-saving devices and measures, including the effects of proper tire pressures, block heaters, maintenance practices and the effects of cold weather on vehicle performance. This information is being made available to the public through the Ontario Energy Savers campaign and other initiatives.

Work was also started on a driver training program for commercial fleets.

Getting Results: Operation Tune-Up

During the summer of 1980, the ministry sponsored **Operation Tune-up** to demonstrate that energy conservation on the road is a simple matter of good driving habits combined with a well-tuned car. **Tune-up** campaigns were held in Toronto, the Hamilton-Niagara area, London, Southern Ontario and Thunder Bay.



ONTARIO MINISTRY OF ENERGY

Ontario Energy Savers Tune-up Program Results



	PARTICIPANT	VEHICLE	WEEK ONE		WEEK THREE		%
			L/100 km	(mpg)	L/100 km	(mpg)	IMPROVEMENT
Toronto	Linda Fox – Toronto Sun	77 AMC Gremlin X	30.80	9.14	18.16	15.53	70
	John Dawe – Global TV	76 AMC Jeep Wagoneer	20.10	14.1	16.21	17.5	24.1
	Dianne Pepper – CKEY-Radio	78 Plymouth Sapporo	24.78	11.5	20.0	14.1	22.6
	Marilyn Anderson – Toronto Star	77 Datsun E10 Wagon	7.82	35.98	6.68	44.01	22.3
	Eddie Luther – CKEY-Radio	80 Honda Civic	6.93	40.62	6.07	46.39	14.2
	Lisette Vangessel – MTV	74 Volvo Stn. Wagon	11.5	25	10.0	28.38	13.7
	Kenneth Smith – Canadian Press	74 Ford Mustang II	9.5	30	8.20	34	13.3*
	Mel Tsuji – CBC-TV	78 Toyota Corolla	10.24	27.5	9.16	31	12.7
	James Curran – CBC-Radio	78 Honda Accord	8.70	32	8.08	35	9.4
	Ann Hunter – CBC-Radio	78 Honda Civic	9.04	31.97	8.40	33.54	8.3
	Bob Cole – CBC-TV	78 Chev Malibu	15.91	17.70	14.99	18.8	6.2
	Phil Ross – CHFI-Radio	77 Toyota Corolla	7.01	40.44	6.69	42.07	4.0
	John Dolan – CFRB-Radio	75 Honda Civic	6.1	46	5.92	47.69	3.7
	Monika Luedicke – CHIN-Radio	79 VW Rabbit	7.34	39	7.02	40	2.6
	Christine Bentley – CFTO-TV	79 Olds Cutlass	11.56	25	12.30	24.5	-2.0**
Hamilton-Niagara	Rick Mauro – Niagara Falls Review	78 Dodge Diplomat	18.57	15.2	13.69	20.6	35.7
	John Kernaghan – Hamilton Spectator	79 VW Rabbit	7.79	36.3	6.30	44.9	23.7*
	Robert Connelly – CHWO Oakville	74 Chevrolet Camaro	12.40	22.8	10.09	28.0	22.9
	Jim Martin – CKTB St. Catharines	71 Datsun 510	9.74	29.0	8.20	34.5	18.8
	Wendy Rosen – Brantford Expositor	76 Pontiac Firebird	15.28	18.5	12.93	21.8	18.1
	John Larocque – CHSC St. Catharines	80 Pontiac Gr. LeMans	14.50	19.5	12.28	23.0	18.0
	John Charbonneau – CJMR Mississauga	76 Chevrolet Malibu	19.31	14.6	16.37	17.3	17.9
	Tedd Colbear – CING Burlington	77 GMC Sierra Pickup	20.00	14.1	17.09	16.5	17.0
	George Szostak – CHCH-TV Hamilton	76 Ford Grenada	14.57	19.4	12.47	22.6	16.8
	Max Wickens – Hamilton Spectator	69 Chrysler Newport	18.71	15.1	16.21	17.4	15.5
	Deborah Walker – CKPC Brantford	74 Pinto Wagon	15.68	18.0	13.57	20.8	15.5*
	Carol Taylor – CJRN Niagara Falls	78 Chevrolet Camaro	19.45	14.5	17.54	16.1	10.9*
	John Hardy – CHML Hamilton	79 Chrysler LeBaron Wagon	11.57	24.4	10.89	25.9	6.2
	Allan Pooley – CHNR Simcoe	74 Chevrolet Nova	19.53	14.5	20.65	13.7	-5.4**
London-Sarnia	Laird Elcombe – CFTJ Cambridge	79 Chevrolet Malibu	12.47	22.65	9.06	31.18	37.7
	Dan Fisher – CKKW Kitchener	74 Chevrolet Caprice	18.74	15.07	14.40	19.61	30.1
	Bill Hayes – CKSL London	80 Mazda GLC	9.14	30.91	7.18	39.33	27.2
	Peter Henderson – CHOK Sarnia	77 Chev Beauville Van	20.7	13.65	17.82	15.86	16.2
	Gary Moon – CKNX Wingham	76 AMC Gremlin X	17.26	16.36	15.30	18.46	12.8
	Robert Brodie – St. Thomas Times Journal	73 Dodge Charger	15.93	17.74	14.48	19.51	10.0*
	Phyllis Bennett – CFPL-TV London	80 Chevrolet Citation	10.04	28.13	9.48	29.79	5.9
	Hugh Patterson – Kitchener/Waterloo Record	78 Buick Century Wagon	14.30	19.75	13.64	20.70	21.3
	Cheryl Hamilton – London Free Press	75 VW Rabbit	17.13	16.49	16.53	17.09	3.6*
	Dave Helwig – CHLO St. Thomas	80 Pontiac Phoenix	7.57	37.34	7.70	36.69	-1.7
	Helen Johnson – Cambridge Reporter	73 Toyota Corolla	8.37	33.76	8.64	32.70	-3.1
	Don Sanderson – CHYM/CKGL Kitchener	77 Pontiac Grand Prix	23.55	12.0	26.42	10.69	-10.9
Thunder Bay	Sirkka Liimatainen – Canadian Uutiset	79 Ford Fairmont	18.72	15.09	15.10	18.71	23.9
	Bob Karr – CFPA-Radio	79 Toyota Celica GT	15.14	18.66	12.67	22.29	19.5
	James Mason – Lakehead Living	77 Pontiac LeMans Coupe	20.75	13.61	17.43	16.21	19.1
	J. P. Fraser – Thunder Bay Chronicle Journal	75 Chevrolet Nova	15.87	17.80	13.49	20.95	17.7
	Barry Third – CKPR/CHFD-TV	76 Mercury Cougar XR7	26.36	10.71	24.71	11.43	6.7†
	Gerry Isherwood – CKPR-TV	78 Toyota Corolla	7.41	38.12	6.96	40.59	6.5
	Bryan Wyatt – CKPR Radio-TV	79 Plymouth Horizon TC3	12.84	22.0	12.83	22.01	.1
Thunder Bay	Soraiya Boland – CKPR/CJSD-FM	76 Chevrolet Impala	10.86	25.8	12.49	22.61	-12.4††

RESULTS IN LITRES PER 100 KILOMETRES (MILES PER GALLON)
* ADJUSTED FOR HIGHWAY
** UNABLE TO ATTEND DRIVER EDUCATION PROGRAM

† ADJUSTED TO CITY DRIVING
†† DUE TO EXTRAORDINARY CIRCUMSTANCES DURING THIRD WEEK OF DRIVING CASE EXCLUDED FROM TOTAL

Energy Conservation

In each area, a number of journalists and media personalities were invited to participate in a three-week program that consisted of the following:

- During the first week, participants drove their cars in their normal manner, except that they were required to keep a detailed record of the distances travelled and the amount of fuel used.
- During the second week, each participant was invited to attend a seminar on driving which was designed to illustrate ways to conserve fuel. As well, each car was given a thorough inspection and tune-up to put it in top operating condition.
- During the third week, each participant kept a record of the distance travelled and the amount of fuel used which was then compared with the results obtained during the first week.

More than 50 journalists and media personalities participated in **Operation Tune-up**. The group achieved an average 15 per cent improvement in fuel economy by the end of the third week. The results of **Operation Tune-up** were widely publicized throughout Ontario.

Easy Goin'

Trucksave, carried out with the co-operation of the Ontario Trucking Association and private industry, continued to promote fuel efficiency in truck fleet operation in the past year. *Easy Goin'*, an audio-visual package and information kit for energy-efficient driver training was produced. More than 110 audio-visual packages and 15,000 pamphlets have been sold to date.

The Trucksave Advisory Committee, with representatives from both industry and government, is currently studying a range of ways to promote energy conservation in the trucking business: a truck maintenance training program,

a new truck specification guide, the effectiveness of add-on devices such as air deflectors and the effect of coolant temperature on fuel economy.

Van Pooling — a More Efficient Way to Travel

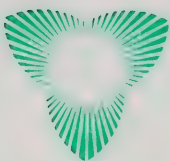
In Canada, van pooling is a relatively new concept in commuting. People who live near each other and have a common work destination are getting together in order to travel to and from work in passenger vans that accommodate about 12 people.

A major TEMP initiative is to encourage van pooling wherever possible throughout the province. The TEMP Outreach program directed to major employers (more than 500 employees) continued to grow in the past year. Thirty company-sponsored van pools have now been formed, representing savings of almost 700,000 litres of fuel annually.

The Ontario Energy Corporation (OEC) announced in June, 1980, the establishment of an affiliated company — the Ontario Van Pool Organization Limited (OVPO) — to encourage the greater use of van pooling by those who commute to and from work by private car. OVPO offers a "third party" service by providing at cost both a van and an administrative service to people who wish to commute by van pool.

OVPO operated 20 van pools in its first year, which represents an annual saving of more than 450,000 litres of gasoline. Plans are underway to have 100 vans operating within the next year.

These van pools will recover both their capital and operating costs and are much more energy efficient than private automobiles per passenger mile on the basis of fuel consumed.



Van pools are a convenient way to save both gasoline and money. The Ontario Van Pool Organization has already organized 24 van pools for a wide range of commuters — from mine workers in Sudbury to provincial government employees in Toronto. Each van pool can save up to 20,000 litres of gasoline per year.



To promote the use of propane for transportation, the Drive Propane demonstration was launched in July, 1980. The Drive Propane goal is to convert 40,000 vehicles to propane by 1985. Deputy Minister of Energy, Malcolm Rowan (centre), and Drive Propane project staff members, Bunli Yang (Ministry of Energy) and Ken Sharratt (Ministry of Transportation and Communications) look on while Bill Payne of the GMC Truck Centre points out features of a propane-powered GMC tilt-cab 7000 series truck.

Energy Conservation

Drive Propane: 40,000 Vehicles by 1985

The April 1980 Ontario Budget provided an exemption from provincial sales taxation for licensed vehicles that are run exclusively on propane, electricity, natural gas, alcohols, or hydrogen. Also exempted from taxation were all natural or manufactured gases, or any product known as liquefied petroleum gas (LPG) when used in any licensed motor vehicle.

To promote the use of propane for transportation, the **Drive Propane** demonstration under TEMP was launched in July, 1980. The **Drive Propane** goal is to convert 40,000 vehicles to propane by 1985, thereby contributing to the provincial goal of substituting 10 per cent of transportation energy consumption by alternative energy sources by 1995.

The 12-month demonstration involves almost 300 fleet vehicles from the private and public sectors. Performance and cost are being monitored; fuel storage implications are being assessed; and a comprehensive communications program on propane is being conducted during the demonstration period.

Other fuels being assessed by TEMP include compressed or liquefied natural gas, alcohols and hydrogen. Electric vehicle developments are also being monitored.

The Ministry of Energy also contributed to the interministerial task forces on hydrogen, provincial rail policy and synthetic liquid fuels as they relate to transportation.

Use the Phone: Save Energy

To save both gasoline and staff travelling time, three ministries — Northern Affairs, Environment, and Transportation and Communications — have set up facilities for teleconferences at different locations throughout the province to permit employees to communicate effectively without travelling to a common destination.

This is part of a comprehensive effort under TEMP to reduce the need for travel. Plans for 1981/82 include an extension of the teleconferencing demonstration to the private sector.

URBAN DEVELOPMENT

Aim: to Maximize Energy Efficiency

The urban development activities of the ministry are divided into three areas: community-scale technology, planning and design demonstrations, and energy planning guidelines.

In the past year, the Ministry of Energy, in co-operation with the Ministry of Housing, increased assistance to municipalities committed to energy-efficient planning. For example, the ministry financed a study by the City of Woodstock, the first Ontario municipality to review its zoning bylaw to indentify any constraints in achieving maximum energy efficiency in new developments.

There is growing evidence that municipalities are taking an active interest in becoming more energy efficient. During the past year, the ministry provided advice and information on energy-efficient community planning to 59 municipalities. Twelve municipalities have now included energy policies in their official plans.

Because of the high level of interest in energy-efficient planning by municipalities, a new grants program called Energy Conservation Through Land Use Planning was created. This initiative will be administered by the Ministry of Housing with total program funding limited to \$250,000 in 1981/82. The purpose of the grants is to provide municipalities with the financial help they need to undertake energy-related planning studies.

A ministry resource package, containing energy information for planners, was distributed to regional planning departments and Ministry of Housing branch offices this year. The package,



which contains 14 books and reports, is currently being updated to incorporate the latest energy-saving information. An energy management handbook to assist urban planners is also being developed.

District Heating...a New Venture

In a co-operative venture, the Governments of Canada and Ontario, the City of Ottawa and three non-profit housing co-operatives agreed, in January, 1981, to build a district heating system demonstration in Ottawa's LeBreton Flats housing project.

This project will demonstrate the operation of a low-temperature, hot water district heating system for residential applications. The Governments of Canada and Ontario will split the \$1.5-million cost of the project under the Canada/Ontario Agreement for the Demonstration of Conservation and Renewable Energy Technology.

Canada Mortgage and Housing Corporation, developer of the LeBreton project, is co-ordinating, designing and constructing the system. The City of Ottawa will own and operate the utility.

Although common in Europe, a district heating system using heated water to warm separately-owned residences has not been tested in Canada. Sometime in the future, district heating systems may even burn garbage to produce both heat and electricity.

In fact, a related study is being undertaken by the Ministry of Energy, the Government of Canada, the Region of Ottawa-Carleton and the City of Ottawa to examine the feasibility of using municipal waste to supplement an existing district heating system that supplies heat to a significant number of buildings in Ottawa. This system could eventually be connected to the LeBreton Flats system.

Energy and Housing Team Up for Co-operative Program

The Housing Energy Management Program (HEMP), a joint Ministry of Energy and Ministry of Housing venture, was established in this fiscal year to co-ordinate efforts in the community planning and the construction and rehabilitation of energy-efficient dwellings.

Through the HEMP program, the Ministry of Energy provided funds to the Ministry of Housing to develop a computer model potentially capable of analysing the effect of changing subdivision design patterns on energy consumption. Funds were also provided by the ministry to investigate the energy implications of "infilling" in small communities.

"Infilling" means utilizing underused, but serviced land in urban areas for small developments, as opposed to building new subdivisions which require a wide range of expensive municipal services.

MUNICIPAL ROLE

Effective Energy Savers

Municipalities spend between eight and 13 per cent of property tax revenues on energy. This means that a typical city of 70,000 spends more than \$1 million annually on energy.

Since 1978, the Ministry of Energy has progressively introduced a range of programs to help Ontario's 839 municipalities reduce their energy consumption and save much-needed tax dollars.

Municipalities have jurisdiction over a wide range of community activities and can be very effective in encouraging energy conservation in areas such as: municipal operations, transportation, planning, zoning, waste disposal and building code enforcement.

Energy Conservation

Through the co-operation and commitment of Ontario's municipalities, the province is making significant progress in achieving substantial energy savings through conservation.

Municipal Commitments Made

In October, 1978, following an invitation by the Minister of Energy to municipal leaders, the Provincial-Municipal Joint Steering Committee on Energy Conservation was formed.

Composed of representatives from the Ministry of Energy, Ontario Hydro and the municipalities, the steering committee's aim is to encourage municipalities to undertake voluntary energy conservation programs and to provide information on energy efficiency for buildings, street lighting, transportation, waste disposal systems and municipal planning.

To date, 150 municipalities, representing 80 per cent of the population, have appointed energy co-ordinators.

Energy Conservation Seminars Initiated

Conservation seminars for municipal energy co-ordinators were initiated in eight regions during the fiscal year to encourage the adoption of energy conservation measures at the local level.

A new forum emerged in the fiscal year for the dissemination of energy conservation information to municipalities. *Network*, a bi-monthly publication produced by the Association of Counties and Regions of Ontario (ACRO) and sponsored by the ministry, covers a wide range of energy conservation opportunities and achievements.

Developed as an extension to the voluntary Municipal Energy Conservation Program, *Network* plays an important role in keeping municipalities up to date on energy matters.

Municipal Energy Audit Announcement

To further assist municipalities in their efforts to reduce energy costs, the ministry announced a Municipal Energy Audit Program as part of its overall 10-point announcement last fall.

Starting in fiscal 1981/82, the Municipal Energy Audit Program will train a group of specialists to assist municipalities in carrying out energy audits of their operations, establish or expand their conservation programs, and develop an energy data base to monitor progress at regular intervals. It is a three-year program, with a funding level of \$3.6 million.

Conservation and Off-Oil Conversion Program

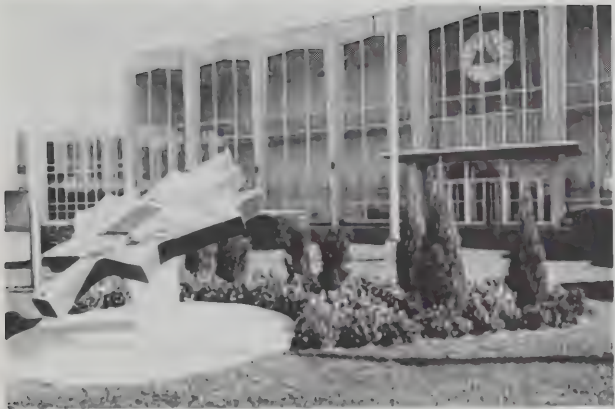
A three-year \$12-million Conservation and Off-Oil Conversion Program, designed to share the costs of oil substitution and conservation activities with municipal governments and other public institutions such as schools, hospitals, homes for the aged, libraries, and municipal recreational facilities, was announced during 1980.

Grants are available to assist eligible institutions to convert oil-burning equipment to electricity, natural gas or other energy sources such as wood and local waste fuels. Grants will also be made available to retrofit oil-heated buildings with energy-saving materials and equipment such as insulation, heat recovery systems, timers and thermostat controls.

The goal of this program is to displace at least 90 million litres of oil with cheaper fuels for a yearly saving of more than \$5 million.

Successful Government Energy Savings

Energy consumption in Ontario government buildings has been reduced by almost 17 per cent since the implementation of a ministry-wide conservation program in 1976.



THE MUNICIPAL COMMITMENT

Durham Region was one of Ontario's first municipalities to undertake a full-scale energy conservation program. It reduced energy consumption by 10 per cent from 1977 to 1978. Durham Region has now set a 15 per cent energy-saving target and operates a three-phase program ranging from simple "in-house" energy efficiency to long-term life-cycle costing.

Energy Conservation

The objective of the five-year program, to achieve a 15 per cent energy saving by 1981/82, was surpassed in the second year. The Ministry of Government Services, which is responsible for most government buildings, achieved a 22 per cent energy saving as of 1979/80, while the Ministries of Correctional Services, Natural Resources and Housing each saved 17 per cent.

Ten years ago, the average energy consumption in government buildings was 70 equivalent kilowatt-hours (kWh) per square foot per year. Thanks to the enormous strides made in energy-efficient design, some recently constructed government buildings use less than a quarter of the energy that would have been consumed a decade ago.

One of the government's first energy-efficient buildings — the Barrie courthouse — used less than 15 kWh per square foot last year, due to a balanced combination of advanced architectural, mechanical and electrical design. It was completed in 1976 and cost \$6.2 million — a price comparable to that of similar buildings with no conservation features.

Saving Energy and Taxpayers' Dollars

Oil currently supplies 22 per cent of the space-heating requirements for Ontario government-owned buildings, which amounts to approximately 18 million litres annually. As a result of a study last year, a \$2.5-million program was announced to convert 338 government buildings from oil to more reliable, less costly energy forms.

The objective of the program is to displace 20 million litres of oil with cheaper fuels for an estimated saving of \$1.1 million a year.

A Team Effort to Save Energy in Commercial Buildings

In April, 1978, Premier William Davis set the stage for co-operation between the public and private sectors on energy conservation. He asked owners and tenants of major downtown Toronto office buildings to participate in a five-point program designed to promote wise energy use in commercial buildings.

During the first reporting year of the Downtown Energy Conservation Program, 17 participating companies reported energy savings of more than 22 per cent.

At 1980 prices, this decrease in energy consumption represents a saving of more than \$2.5 million.

In February, 1981, the ministry launched the Downtown Energy Conservation Program in Ottawa in co-operation with the Building Owners and Managers Association of Ottawa, Ontario Hydro and Ottawa Hydro.

The Ottawa downtown program will follow the same five-point program that was undertaken successfully in Toronto:

- Each company president appoints a senior executive to lead a company-wide energy conservation program.
- This person works with officials from the Ministry of Energy and local utilities to assess ways of reducing the company's energy consumption.
- Each company sets corporate objectives to reduce its energy bill.
- To demonstrate business leadership in the area of energy conservation, senior executives do an evaluation of their company's use of energy.
- The Ministry of Energy reports back after a year on the status of the skyline and outlines savings achieved in all forms of energy used by the commercial buildings involved in the program.



CONSERVATION AND INDUSTRY

Increasing the Energy Efficiency of the Industrial Sector

Commencing in April, 1980, the Ministry of Energy has significantly increased the scope of the Industrial Energy Management Program administered by the Energy Projects Group of the Ministry of Industry and Tourism.

The goals of the enhanced program are two-fold:

- to reduce the percentage of oil currently used in the industrial sector to no more than 10 per cent of the total by 1990;
- to achieve a 25 per cent reduction in the energy required per unit of output by Ontario's industrial sector by 1985, compared with the 1975 level.

Incentives to Stimulate Industrial Off-Oil

In support of these goals, the Minister of Energy announced a three-year, \$10-million Industrial Energy Conservation and Oil Substitution Incentive Program in October, 1980. It is designed to reduce significantly oil used by industry (about 15 per cent of Ontario's crude oil consumption) and to promote energy conservation in Ontario's manufacturing sector.

The program provides incentives of up to \$50,000 per company (or up to 25 per cent of the cost) to assist in the switch from oil to more abundant substitutes such as natural gas, electricity or coal. It also encourages the replacement of inefficient manufacturing machinery with energy-saving processes, controls and equipment.

In the first three months of the program, more than 100 incentive grant applications were received, representing \$1.7 million in private investments.

It is expected that participating industries will conserve the equivalent of 25 million litres of oil as a result of the Industrial Incentive Program.

Development of High-Efficiency Boilers

The Ministry of Energy is sponsoring development, by the Canadian Gas Research Institute, of high-efficiency, gas-fired hot water boilers for commercial and industrial use.

Conventional boilers operate at thermal efficiencies ranging from 40 to 70 per cent due to high stack losses. The new CGRI prototype extracts useful heat by condensing most of the water vapour from the flue gas, thereby achieving thermal efficiency in the range of 88 to 93 per cent.

Following extensive field testing of various sizes and designs of the new boiler, commercial versions are expected to reach the marketplace in 1984.

Energy Bus Identifies Savings

The Energy Bus program is now in its fourth year of operation, assisting industry and commercial enterprises in the identification of potential long-term energy conservation measures.

To date, the Energy Bus has visited 1,277 companies and identified more than \$48 million in potential energy savings. This amounts to an average possible saving of \$38,000 for each company visited.

With the combined assistance of the Energy Bus audit and the Ontario Industrial Energy Conservation and Oil Substitution Program, many Ontario industries now have the means and incentive to become more energy efficient.

Energy Conservation

Industrial Energy Saving Technology Demonstrations

The Governments of Ontario and Canada are participating in an industrial program geared to projects large or small that can demonstrate an attractive reduction in energy use. The project must have good potential for broad acceptance without the need for further government assistance.

At the conclusion of the fiscal year, the following three industrial projects totalling more than \$640,000, were supported with combined government funding in excess of \$225,000:

- sap concentration by reverse osmosis for the production of maple syrup;
- ground water air conditioning;
- fuel alcohol from waste by-products.

Projects now under review for fiscal 1981/82 include analysing the potential for substantial energy savings through water-source heat pumps and the benefits of cogeneration of steam and electricity in an industrial plant.

Cogeneration

Cogeneration is the simultaneous production of thermal energy and electricity from a single fuel source; for example, steam and electricity from gas, coal, biomass or municipal solid wastes.

An industry with large process steam requirements can produce electricity through cogeneration to greatly increase the efficiency of fuel consumption.

Given the concentration of heavy process industries located in Ontario and given the support of Ontario Hydro, this province is uniquely suited to cogeneration. Furthermore, cogeneration will become increasingly attractive as the cost of conventional energy continues to rise.

Studies suggest that up to 5,750 megawatts of electrical power are technologically available within the province through cogeneration. This represents about 20 per cent of Ontario Hydro's capacity, and could provide important advantages such as improved thermal efficiency, flexibility and diversity of fuel usage.

Other advantages of cogeneration are: a potential contribution to the power needs of remote areas; a way to help satisfy peak demand requirements; and as parallel generation to meet Ontario Hydro's total system requirements in the future.

There are more than 40 municipalities in Ontario which produce enough solid waste to make cogeneration of steam and electricity attractive. Technical and economic feasibility studies are underway in a number of interested municipalities to identify projects which could solve serious waste disposal problems as well as produce steam and electricity for municipal and industrial use.

Ontario Hydro supports cogeneration and has established provisional rates for purchasing cogenerated power from industry. In co-operation with Ontario Hydro and the Ontario Energy Corporation, the Ministry of Energy is contributing to site-specific studies to assess major potential cogeneration opportunities.



Premier William Davis officially opened a solar energy system at the Ontario Correctional Institute in October, 1980. The 93 square metres (1,000 sq. ft.) of solar collectors, with a 7,260 litre thermal storage system, are designed to provide about 35 per cent of the energy needed to heat the 11,800 litres of hot water required daily for use by 200 prison inmates.

Increased Emphasis on Alternatives

As a result of the new policy targets set out in the ministry's October 1980 announcement, the search for renewable energy alternatives has been given increased emphasis. This year, the ministry budgeted \$6.9 million on programs in this area, compared to \$2.6 million in the previous year.

The new target is to produce at least five per cent of Ontario's primary energy requirements by 1995 from renewable and recoverable energy resources. These resources include municipal and forest wastes, industrial waste heat, agricultural crop residues, poplar plantations, synthetic liquid fuels from biomass, and solar applications.

In layman's language, this represents an energy equivalent of approximately 42 million barrels of oil annually, a significant energy saving.

The ministry, in co-operation with the private sector, is pioneering much of the research and investigation into the use of renewable and recoverable energy resources for Ontario.

SOLAR

\$50-million Solar Program Announced

Ontario's solar program received a significant boost in the past year with the announcement of a \$50-million, five-year program to accelerate the development of solar energy

Renewable Energy

technology, and to provide market assistance for an Ontario-based solar industry.

By 1995, solar energy could contribute as much as two per cent of Ontario's energy needs — or 15 million barrels of oil equivalent — enough to heat more than 700,000 homes a year.

During the period 1975-1980, 30 government-sponsored demonstrations of solar energy systems were carried out in order to identify applications which offer the greatest potential for contributing to provincial and national energy needs, and the development of a solar energy industry.

This five-year start-up phase provided the time to identify the "best" systems and applications for what is essentially a whole new technology based primarily in Ontario.

Phase 1 (up to 1985) will concentrate on ensuring that industry is capable of developing and delivering cost-effective, reliable products. This will be done through financial and technical assistance programs and limited incentives to the commercial and industrial sectors to pre-build the market.

Phase 2 (up to 1995) will emphasize a shift to market development assistance in the form of general (residential, commercial and industrial) consumer incentives, provided that satisfactory progress has been achieved in Phase 1.

The program is designed to stimulate the market for active solar energy systems, principally for heating hot water in the commercial and industrial sectors.

Solar Energy and the Home

Passive solar energy in new construction received increased emphasis in the past year with the awarding of contracts to 14 Ontario home builders for the design and construction of 20 passive solar energy homes based on modified building standard designs.

This \$200,000 passive solar housing design project is jointly conducted by the Ministry of

Energy and HUDAC (Housing and Urban Development Association of Canada). To date, eight houses have been officially opened, and 10 more have been completed.

Under this project, annual energy savings of 45 per cent have been identified. There is a potential for even higher savings with the development of new designs.

Funding for these projects is provided under the Canada/Ontario bilateral agreement.

There is great potential for use of passive solar energy in entire subdivisions. AMEX Developments Limited received a grant from the ministry to demonstrate the use of solar heating and energy-efficient features in a subdivision of 440 homes.

Solar Water Heating Technology Advances

The technology for solar water heating systems has come a long way in five years. As a result of knowledge and experience gained in this innovative area, the ministry has initiated a number of activities to boost the use of solar hot water systems throughout the province.

A solar energy system, designed to pre-heat the water supply at the Ontario Correctional Institute in Brampton, began operation in October, 1980. Solar panels, mounted on the roof of the institute, provide hot water for 200 prison inmates.

In the fall of 1980 the ministry, in co-operation with Ontario Hydro, installed solar hot water systems in five Etobicoke private homes and will continue to monitor their performance and reliability.

Construction was also started on a solar hot water system at Cambrian College in Sudbury. The solar energy system will pre-heat the domestic hot water supply for the college's new physical fitness centre. It will also be proof positive that solar energy can work in a colder, northern climate.



George Ashe, Parliamentary Assistant to the Minister of Energy and designer Ross Norris discuss the energy-saving features of a home in Stoney Creek. The passive solar, energy-efficient house, expected to cost 38 per cent less to heat each year than a standard home, was built by Geofcott Properties (1977) Limited. It was among eight homes officially opened in the fiscal year with financial help from the federal and provincial governments.

Tenders were called in December by Mohawk Hospital Services for the supply of solar collectors for a \$1.3-million project to pre-heat the water at Mohawk Hospital Services, a non-profit laundry that services hospitals in the Hamilton area. This program is a joint effort of the Ministries of Energy and Health, Mohawk Hospital Services and the Government of Canada as part of the Canada/Ontario Conservation and Renewable Energy Demonstration Agreement.

There is even a use for solar energy in the province's parks. In co-operation with the Ministries of Natural Resources and Northern Affairs, a total of 13 solar hot water systems were installed last fall in provincial park comfort stations. The systems will be started up this spring.

The highrise apartment and the farm are also included in the ministry's solar energy program. In co-operation with the Ministry of Housing, tenders were called in December for the design, supply and installation of a solar energy system to pre-heat the domestic hot water system in a Toronto apartment building. A contract was also awarded for the supply and installation of a solar energy system to heat the barns at the Arkell Swine Research Centre near Guelph.

Monitoring Solar Projects

The ministry continued to monitor and assess more than 30 previously commissioned solar demonstrations. They include:

- solar heating of a swimming pool at the Richvale Community Centre;
- a package space heating system, called a "backyard solar furnace," designed to provide part of the heat for a Toronto bungalow;
- a senior citizens' residence in Aylmer, the first Canadian apartment building to be substantially solar-heated;
- West Humber Collegiate in Etobicoke which has a solar system that provides about half the school's hot water needs;
- Applewood Public School in St. Catharines, Canada's first solar-heated school. Applewood is using about one-fifth of the energy consumed by older Lincoln County schools of equivalent size, built under conventional designs.

The Ministry of Energy completed a number of planning studies during fiscal 1980/81. These included:

- a study to identify potential industrial applications for solar energy;
- a study to assess the potential of simple solar thermosyphon water-heating systems (systems which use no pumps) suitable for cottages;
- a study to determine the amount of labour, materials and capital investment required to achieve the ministry's solar energy target as outlined in *Energy Security for the Eighties: A Policy For Ontario*.

A contract was awarded for the performance monitoring of active energy systems sponsored by the Ministry of Energy. A single monitoring contractor will ensure consistency of performance results and provide valuable information to the solar energy industry and potential users of solar energy systems.

Solar Standards

The ministry continued its participation in the development of standards for the solar industry by being active on the Solar Standards Steering Committee of the Canadian Standards Association (CSA), as well as chairing the Technical Committee on Solar Collector Standards and the Technical Committee for Solar Domestic Hot Water Systems.

Standards from the two technical committees are expected in the fall of 1981. These standards will provide guidance to the solar industry for the development of more reliable products.

ENERGY FROM WASTE Putting Waste to Work

Municipal solid waste poses many problems for municipalities. Converting as much solid waste as possible into energy can make use of a commodity that would otherwise be abandoned. Many municipalities, industrialists, and engineers are now recognizing the potential use of this promising new energy source, and are working closely with the ministry on a variety of studies and projects.

As a result of the 15-year, \$3-billion Energy From Waste Program announced in March, 1980, activity was greatly accelerated in the 1980/81 fiscal year.

Twelve municipal waste projects which could produce steam and/or electricity are under detailed evaluation with a total estimated capital cost of between \$317 million and \$433 million.

This would use up to 2.2 million tonnes of municipal garbage annually — 40 per cent of the municipal solid waste now produced in Ontario — a saving of about 2.5 million barrels of oil.



Ontario's Energy from Municipal Waste Projects

Name	Barrels of Oil* Equivalent		Waste Quantity		Cost of Feasibility Study	Estimated Cost of Facility (1980 \$)	Energy to be Produced
	per day	per year	Tonnes/day	Tonnes/year			
1. Commissioners Street Heat Recovery Project, Toronto	900	206,000	815	187,000	40,000	8,000,000	Steam
***2. Tricil/Swaru Cogeneration, Hamilton	330	121,000	300	110,000	10,000	1,600,000	Electricity
+ + 3. Niagara Region/Ontario Paper Project, Thorold	860 to	232,000	770	211,000		75,000,000	Steam/
	2,360	645,000	2,140	586,000	200,000	95,000,000	Electricity
+ + 4. St. Catharines/General Motors Project	200	62,000	180	56,000	50,000	8,000,000	Steam
						9,500,000	
5. Ottawa-Carleton District Heating Project	1,500	302,000	MSW 550 wood 450	275,000	1,000,000	75,000,000	Steam/ Electricity
6. Nordfibre Plant Project, North Bay	200	66,000	MSW 87 wood 94	60,000	48,000	9,000,000	Steam
7. Peel Region	628	326,000	570	296,000	520,000	79,000,000	Steam
**8. Toronto District Heating Incinerator	1,400	418,000	1,270	380,000	250,000	80,000,000	Steam
9. Victoria Hospital, London	250 to	77,000	225	70,000		20,000,000	Steam
	450	140,000	410	127,000	200,000	37,000,000	
10. Owen Sound Hospital Project	50	15,500	45	14,000	20,000	3,000,000	Steam
11. Sudbury/Inco Project	385	106,000	350	96,000	60,000	15,000,000	Fuel/Compost
**12. R.L. Hearn Generating Station, Toronto	2,100	539,000	1,900	490,000	540,000	110,000,000	Steam/ Electricity
Total		1,762,500		1,601,000	2,938,000	317,100,000	
		to		to		to	
		2,466,500		2,241,000		432,600,000	

Demonstration Projects

****1. Watts from Waste, Toronto	1,100	275,000	1,000	250,000	2,400,000	55,000,000	Electricity
2. Woodstock Cement Plant	275	88,000	250	80,000	40,000	250,000	Fuel
* One tonne of MSW refuse is about equivalent to 1.1 barrels of oil.							
*** Tricil and the Ontario Energy Corporation are currently in negotiation to establish an electrical generating capability at the Swaru plant.							
+ + /** Some projects being assessed could compete for the same MSW source. Therefore, not all projects may go ahead.							
**** Being assessed with other Toronto projects under the Metro Waste Management Master Plan.							

Several other applications are being evaluated for the generation of energy from municipal refuse. As well, studies are underway into the need for further development of commercial energy-from-waste systems in small communities; the use of landfill gas as an energy source; and the nature and extent of atmospheric

emissions from municipal solid waste incinerators.

Two projects that involve the burning of municipal refuse to produce steam for area industries — in St. Catharines and Thorold — are now at the stage where accurate cost information is being developed.

The St. Catharines study has indicated the technical feasibility of burning an estimated 180 tonnes of city garbage per day to produce steam for use by the St. Catharines General Motors of Canada Limited plant.

The Thorold study has shown that up to 2,100 tonnes per day of municipal solid waste could be burned in a plant linked to the Ontario Paper Company Limited.

Last summer, the ministry and Ontario Hydro announced they are co-financing a \$540,000 study to test the feasibility of installing refuse-fired steam boilers at the R. L. Hearn Generating Station in Toronto.

Under the Hearn proposal, the boilers would burn 2,000 tonnes of municipal waste per day to produce 204,000 kilograms of steam per hour for a downtown heating system. This would represent 30 per cent of Metropolitan Toronto's garbage. This option is now being compared with a City of Toronto proposal for a new refuse-fired steam plant located on city property at Cherry Street.

A study to determine the feasibility of an energy-from-waste facility for the Victoria Hospital complex in London was also announced last summer. The ministry is funding 50 per cent of the study, with the remaining 50 per cent being shared by Victoria Hospital, the City of London and the Ontario Ministry of Health.

By incinerating up to 85 per cent of London's processable municipal refuse a day, the facility would provide energy in the form of steam for use and distribution by the London Victoria and other nearby hospitals. The steam would not only provide space heating for the hospital, but also would have other uses, such as heat for food preparation areas and laundry facilities.

A \$60,000 study is being undertaken in the Region of Sudbury to determine the feasibility of converting solid municipal waste into densified, refuse-derived fuel and compost material. Inco Metals, Ontario Division, is a potential user of the energy source. The study is being financed on a cost-sharing basis, with the Ministry of Energy

providing 50 per cent, and the Region of Sudbury and Inco Metals each providing 25 per cent.

A feasibility study, co-funded by the Ministry of Energy and completed in April, 1980, determined that an energy-from-waste plant proposed for North Bay would be technically and economically viable. As a result, the Ontario Energy Corporation (OEC) is negotiating with the Nordfibre Company on this proposal.

The first energy-from-municipal-waste plant is now under construction as a result of a joint venture agreement between the Ontario Energy Corporation and Tricil. The 4 megawatt generator will cost about \$2 million.

Wood and Wood Wastes

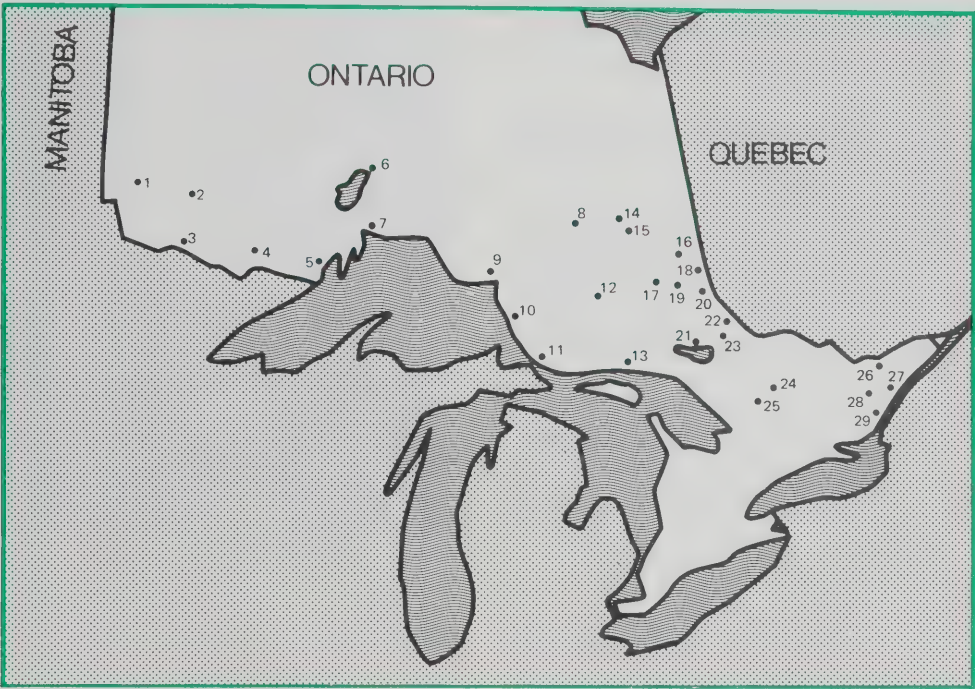
When wood is harvested in logging operations, a considerable volume is left behind as branches, tops, unwanted trees and other debris. Millions of tonnes of these forest (bush) residues could be harvested for fibre or energy use.

The energy potential of forest residue and unutilized trees is estimated at 8.4 million barrels of oil annually.

Effective utilization of waste residues from one of Ontario's largest industries — forest products — would represent a major technological breakthrough in the use of solid fuel; converting waste materials into a very usable form of energy that can replace fossil fuels in existing installations.

Such a system began operation at a plywood mill in Hearst with the installation of a commercial wood gasifier to convert wood wastes into gas suitable for natural gas replacement.

Omnifuel Gasification Systems Limited of Toronto received a \$409,000 contribution to build the gasifier from the Ontario Ministry of Energy and Energy, Mines and Resources Canada as part of the Canada/Ontario Agreement on the Development and Demonstration of Renewable Energy and Energy Conservation Technologies.



Some Energy from Wood and Forest Waste Plants Now in Operation

1. Kenora – Boise Cascade Canada Ltd.

2. Dryden – Great Lakes Pulp & Paper

3. Fort Frances – Boise Cascade Canada Ltd.

4. Atikokan – Pluswood Manufacturing Ltd.

5. Thunder Bay – Abitibi-Price Northern Wood Preservers Ltd.
– Abitibi Paper Co. Ltd. (2)
– Abitibi Forest Products Ltd.
– MacMillan Bloedel Ltd.
– Great West Timber Ltd.

6. Longlac – Weldwood of Canada Ltd.

7. Red Rock – Domtar Packaging Ltd.

8. Hearst – Levesque Plywood (two plants)
– Nawaygo Timber Co. Ltd.
– Shell Woodex

9. Marathon – American Can of Canada

10. Dubreuilville – Dubreuil Brothers Ltd.

11. Sault Ste. Marie – Abitibi Paper Co. Ltd.

12. Chapleau – Chapleau Lumber Co. Ltd.

13. Espanola – E.B. Eddy

14. Kapuskasing – Spruce Falls Power & Paper Co. Ltd.

15. Smooth Rock Falls – Abitibi Paper Co. Ltd.

16. Iroquois Falls – Abitibi Paper Co. Ltd.

17. Timmins – Waferboard Corp. Ltd.

19. Elk Lake – Elk Lake Lumber

20. New Liskeard – Malette Lumber
– Rexwood Products Ltd.

21. Sturgeon Falls – Abitibi Paper Co. Ltd.

22. Mattawa – G.W. Martin Lumber Ltd.

23. North Bay – Nordfibre Ltd.

25. Huntsville – Domtar Construction Materials
- Under Study
18. Monteith – Monteith Correctional Institute

23. North Bay – Nordfibre Ltd. (second plant)

26. Ottawa – Ottawa-Carleton Project

29. Edwardsburgh – Edwardsburgh Biomass Energy Study
- Some Potential Study Sites in Public Buildings
5. Thunder Bay – Lakehead University
– Hillcrest High School

24. Dorset – Leslie M. Frost Natural Resources Centre

27. Kemptville – Kemptville College of Agriculture and Technology

28. Smiths Falls – Smiths Falls Rehabilitation Centre
- 57

Renewable Energy

Another project designed to demonstrate the commercial use of wood as a fuel is underway at the Monteith Correctional Institute near Timmins. Initial studies indicate that wood could soon be used to heat the complex.

Numerous projects, designed to increase the availability of fuelwood, were implemented in co-operation with the Ministry of Natural Resources.

In February, the two ministries announced a \$250,000 winter fuelwoods program for Southern Ontario. The program will make available increasing amounts of good quality firewood to meet the growing Southern Ontario market.

A survey of the potential for residential wood heating in rural and small urban communities was also launched in co-operation with the Ministry of Natural Resources. As well, a *Wood Burner's Handbook* that describes all aspects of wood-burning equipment and costs, is nearly completed. This "everything you wanted to know about wood-burning" guide, is being published by the ministry in conjunction with the Canadian Wood Energy Institute.

Also underway are more than a dozen investigations into the possibility of retrofitting existing commercial and industrial boilers to wood burning.

A \$120,000 study was announced in July to assess the feasibility of producing methanol, steam and electricity from wood in Edwardsburgh Township.

Phase one was completed in January. It was determined that Eastern Ontario could provide more than a million dry tonnes of wood and wood waste each year to turn into energy. In phase two, the engineering design and costs of each proposed energy production facility is being evaluated, based on information gathered initially.

Later phases will compare the costs and revenues of the facilities at the suggested locations as well as the social cost/benefits of the proposals — including both local economic development and the impact on Ontario's goals for a more secure energy future.



Sawdust and bark — wood waste that has become a valuable energy source for Ontario. By 1995, energy from waste and biomass will supply the equivalent of 27 million barrels of oil annually. That is, energy from municipal solid waste, forest and agricultural biomass and waste, industrial by-product heat and synthetic liquid fuels from biomass will represent nearly four per cent of Ontario's total energy supply.

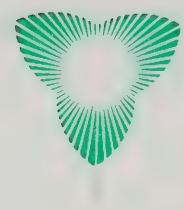
Forest Biomass Institute Announced

A world-class institute for forest biomass research to be established at Maple was announced in March, 1981.

The new Ontario Institute for Forest Biomass Research will help co-ordinate world research and development of trees for rapid biomass growth and production. The institute will be managed by the Ontario Ministry of Natural Resources.

Under the Building Ontario for the 1980s or BILD program, \$1.5 million will be provided for the facilities and additional annual operating funds will be provided by Ontario.

Ontario is recognized as a world leader in hybrid tree research. The new institute will concentrate on the genetics of breeding fast-growing tree species and forest biomass production technology.



Ontario is already recognized as a world leader in hybrid tree research. To gain further expertise in the breeding and developing of fast-growing hybrid tree varieties, a world-class institute for biomass research will be established in Maple, Ontario. The photo above shows a mini-rotation poplar plantation showing two-year old sprouts on six-year old stumps (root system) of a hybrid poplar.



This photo shows a short rotation poplar plantation with 15-year-old hybrid poplar trees in 3m. by 3m. spacing.

It will also train scientists and specialists, keep abreast of international research, and liaise with universities and other research institutes.

Agriculture and Renewable Energy

In the past 40 years, agriculture has achieved enormous increases in productivity. In 1940, for example, an Ontario farmer could feed 15 persons; today he can feed 80. Much of the gain has come about because of an abundant supply of low-cost energy for tractor fuel, and inexpensive petroleum-based fertilizers and chemicals.

In the past decade, energy costs have quadrupled, driving up the cost of fuel, fertilizer, feed, pesticides, and other essential inputs.

In the next two decades, the price of energy will probably rise much higher, and some fuels may even become scarce. These facts, and other economic influences, mean that farmers and governments must develop and implement ways and means of using less energy — especially oil — while continuing to produce more food.

The Energy in Agriculture Policy Committee was established in June, 1980 to assess the energy needs of agriculture over the next 20 years. In order to recommend an energy strategy for Ontario agriculture, the committee considered the following:

- greater energy efficiency and conservation in food production;
- substitution of alternative fuels for oil;
- protection and development of Ontario's foodland;
- development of energy production from agriculture;
- use of industrial waste heat to expand food production.

The committee is currently compiling its findings.



Many opportunities exist for farmers to use innovative techniques and alternative energy sources in their day-to-day operations — innovations which could allow them to use energy more efficiently, afford them a measure of protection from rising energy costs and potential fuel shortages, and protect their industry to the benefit of us all.

Ethanol and Farm-Scale Stills

A \$100,000 program to examine the technology and costs of farm-scale ethanol stills was initiated in September in co-operation with the Ministry of Agriculture and Food. Several demonstration stills will be constructed by fall.

Approved projects are eligible for grants of 40 per cent of the capital cost, including paid labour, to a maximum of \$15,000 for an on-farm still constructed by an individual farmer; and up to \$20,000 for a still installed by a small group of farmers on a co-operative basis.

Methane from Manure

As part of a five-year research study at the University of Guelph, a farm-scale methane gas demonstration unit has been constructed at the Arkell Swine Research Station near Guelph.

In addition, a new methane gas research facility, with two experimental digesters, is expected to be operational by summer. The objective is to develop improved methods of producing methane from manure for use on livestock farms.

The Ministry of Energy is financing the capital cost of both projects through the Ministry of Agriculture and Food which will manage the project in co-operation with the University of Guelph and the Ontario Pork Producers' Marketing Board.

Methane from Landfill Sites

The ministry is co-funding a study with Metropolitan Toronto to assess the feasibility of recovering usable gas from the Beare Road landfill site. If practical, the gas could be used by the Metro Zoo or other facilities such as a greenhouse or ski chalet.



The utilization of landfill gas at several other municipalities is also being negotiated.

Remote Power Systems

Electrical power at locations remote from the Ontario Hydro grid is most commonly provided by a diesel-powered generator.

In some of these remote areas, however, diesel fuel is costly, and alternative energy sources, such as wind, photo-voltaics and small-scale hydraulic systems, become competitive.

A contract was awarded in February to design, erect and test a 50 kilowatt wind-diesel generator in the Sudbury area. A previous project conducted on Toronto Island in 1978 (summarized in a report released by the ministry in 1979 called *Development, Installation and Testing of a Wind Turbine Diesel Hybrid*), indicated that, when coupled with diesel generators, wind turbines show promise for use in certain remote areas of the province.

A study, commissioned by the Ministry of Energy to collect wind generator and annual power production data, was completed in November. The study, done by the Ontario

Research Foundation, will be used as the basis for an introductory guide to low-power wind generators. The results are to be published in the 1981/82 fiscal year.

ALTERNATIVE TRANSPORTATION FUELS

In March, 1980, the Ministry of Energy established a Synthetic Liquid Fuels Task Force to review the changing energy situation, particularly as it affects transportation.

On October 10, 1980, as part of the government's \$165-million energy conservation and oil substitution program, a \$75-million, five-year Alternative Transportation Fuels Program was announced.

Ontario uses about 35 per cent of the crude oil consumed in Canada. Since the transportation sector (automobiles, trucks, aircraft, trains, buses and other vehicles) uses about half of that oil, transportation is a key area for the reduction of oil consumption.

Goals for Oil Substitution

Ontario's alternative transportation fuels policy is:

- to accelerate the development of alternative transportation fuels;
- to encourage their substitution for conventional fuels in Ontario's transportation sector.

In unveiling details of the Alternative Transportation Fuels Program in February 1981, the Minister of Energy set both short-term and long-term goals.

The short-term goal (to 1985) is:

- to displace two per cent of the gasoline used in Ontario by encouraging the use of propane, natural gas and some on-farm alcohol.



Wind speeds in Ontario

Renewable Energy

By 1985, the equivalent of 230 million litres of gasoline annually could be displaced by these alternative fuels.

The long-term target (to 1995) is:

- to displace 10 per cent of the total transportation fuel used in Ontario by alternative fuels.

By 1995, the equivalent of almost 1,600 million litres of gasoline could be displaced annually.

The Alternative Fuels

Among the alternative transportation fuels being considered are: propane, natural gas, synthetic liquid hydrocarbons, synthetic gasoline, methanol, ethanol and hydrogen. Electricity, while not a fuel, is also an energy form that has a role in supplying power to transportation.

These alternative fuel forms will not all become available at the same time. Three factors determine when a fuel becomes commercially available:

- production is technically feasible (i.e. when the feedstock and conversion technology are available);
- its cost is close to that of conventional fuels;

- distribution and utilization technology and economics are attractive to the end user.

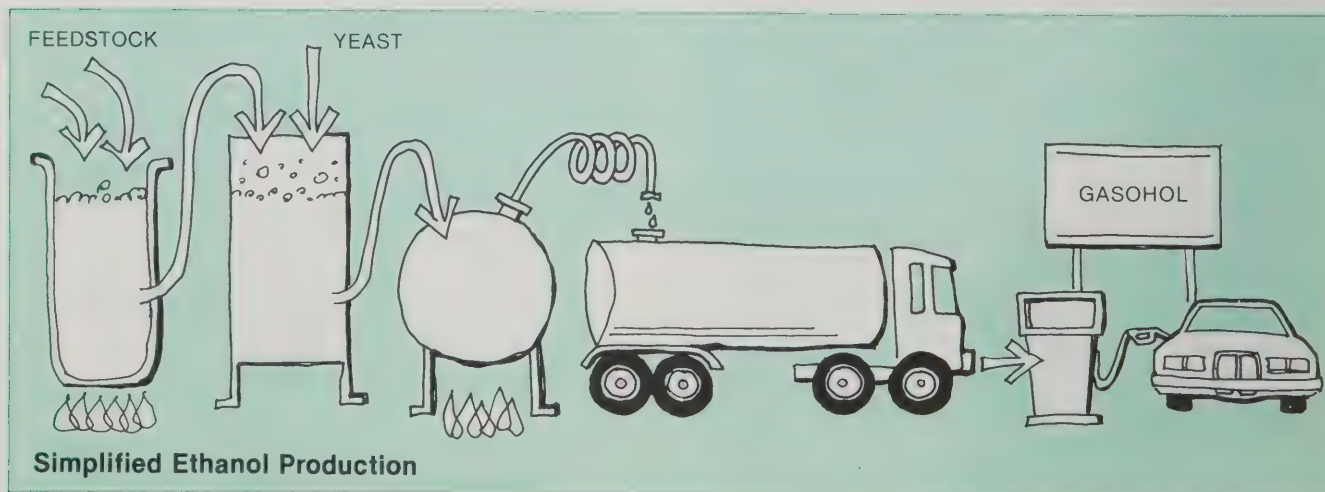
The Ontario Hydrogen Energy Task Force continued its assessment of the role hydrogen could play in Ontario's energy future. In addition, the Minister of Energy proposed to the federal government that a Hydrogen Energy Technology Centre be established in Ontario. Hydrogen is seen to have a bright future in Ontario, both as an extender of hydrocarbon fuels and as a fuel in its own right.

Areas requiring specific investigation were identified and studies were commissioned to provide information on which to base the Hydrogen Energy Task Force's findings and recommendations.

Program Strategy

The program will promote the commercialization and use of alternative fuels to increase the amount of energy produced in Ontario and lessen the province's dependency on crude oil.

The ministry will also support the research, development and demonstrations needed to develop the supply and use of fuels, such as hydrogen, that may have significant long-term energy and economic benefits for Ontario.





To encourage the commercialization of these alternative transportation fuels, the Government of Ontario's tax incentives include:

- a sales tax exemption for vehicles designed for exclusive use of alternative transportation energy forms including gaseous fuels (propane, natural gas, and hydrogen), alcohols (ethanol and methanol) and electricity;
- a provincial gasoline tax exemption for alternative transportation fuels, whether used alone or in blends with gasoline or diesel fuel.

Research, Development and Demonstration

The province plans to develop those options that use Ontario resources, especially:

- ethanol from agricultural feedstocks or food-processing waste;
- methanol from Onakawana lignite or possibly peat and wood; and
- hydrogen produced by means of nuclear-generated electricity.

In the short term, methanol and hydrogen may be supplied from natural gas until markets are developed. Ontario will also develop and demonstrate technology for alternative fuel distribution and use, such as:

- fuel-tolerant engines able to use both high-level methanol blends and straight alcohol;
- hydrogen fuelling and on-board storage systems for public transit vehicles;
- electric and hybrid vehicles.

The private sector will be encouraged to share the cost with the province in many areas, especially in the demonstration and commercialization stages.

The province will also be seeking federal cost-sharing under an expanded federal research and development program, established under the National Energy Program, which includes \$50 million to \$100 million for alternative transportation fuels over the next five years.

These cost-sharing arrangements could produce at least a doubling of the provincial funding allocation.

Program Management

Management of the Alternative Transportation Fuels Program is the responsibility of the Ministry of Energy, which will contract with a number of private firms and public sector agencies. The latter include Ontario Hydro, the Ontario Energy Corporation, the Urban Transportation Development Corporation and the recently announced the Ontario Institute for Forest Biomass Research.

Initial Activities

A contract with the Urban Transportation Development Corporation for a hydrogen demonstration in urban transit is in the final stages of negotiation. Hydrogen, which can be produced with electricity, might provide the same benefits as the direct electrification of rail.

Programs have been initiated in the areas of fuel supply development, electric vehicles, and advanced fuels and engine testing with the Ontario Energy Corporation, Ontario Hydro and the Ministry of Transportation and Communications. Discussions are also underway with Ontario natural gas transmission and distribution companies on a compressed natural gas demonstration.

The public's interest in the latest, most up-to-date information on energy issues has led to a streamlining of the communications function within the ministry to better meet that need.

During the fiscal year, the ministry offered a full range of communications services: from speeches and background Energy Notes, to a comprehensive advertising and conservation awareness campaign, to public displays, a telephone and mail inquiry service and production of a complete range of pamphlets and publications.

A New Structure

To meet the exponential growth in inquiries, the information services function within the ministry was consolidated into a single Communications Group in early 1981. Previously, the information personnel within the ministry had been decentralized and attached to program areas. However, the increasing demand for such services as design and production, audio-visual aids, display materials etc. from all sectors of the ministry made a compelling case for a centralized communication function.



Some ministry publications of the fiscal year.

Public Demand for Information Increases

The consolidated Communications Group has already demonstrated some important benefits. For example, under the new public inquiries section, all telephone requests for information are handled by a trained group of personnel which can provide answers on all energy-related matters. By the end of the fiscal year, the



Minister and Staff of the Ministry of Energy at the launching of the Ontario Energy Savers campaign.



ministry was receiving about 3,000 telephone inquiries a month from the general public.

Part of the large public demand for information was met with increased use of displays, pamphlets and printed literature. The ministry participated in more than 17 exhibits or shows during the year, and organized more than 47 seminars or conferences on specific energy subjects ranging from energy-efficient community planning to alternative transportation fuels.

During the year, the ministry published more than 20 technical reports, more than 20 leaflets and pamphlets to assist the public on energy issues, and a number of energy case studies.

Similarly, the new format of Energy Notes — which provide background information on what the ministry or others are doing in particular areas of energy concern — was introduced during the year and has been well received by the public as a new information medium.

A New Advertising Program

The Voluntary Energy Conservation Communications Program, a combined advertising and promotion campaign designed to encourage the public to save energy, was expanded during 1980.

The need for the campaign was derived from a benchmark study undertaken by the federal government in late 1979. This study was tested in Ontario in early 1980 and it confirmed the federal findings that many people were simply not convinced of the need to save energy, or that they were reluctant to adopt conservation habits because they felt these implied a lessening of lifestyle.

Through the combined thrust of advertising and public relations activities, the ministry's challenge has been to try to overcome public scepticism over whether conservation is necessary, and whether it implies a lessening in the quality of life we enjoy.

Ontario Energy Savers a Success

Although this is a difficult challenge, the Ministry scored some stunning successes in its first year of this ambitious program. A public relations activity — a media tune-up in four market areas of Ontario — gained dramatic attention when media personalities recounted both on the air and in print, how they could achieve remarkable energy savings by driving their cars more advisedly and in better tuned-up condition.

This program, which was undertaken in Toronto, Hamilton-Niagara, London-Kitchener-Sarnia, and Thunder Bay regional centres last summer, was so successful in capturing the public's attention, that the ministry will repeat it in different centres this year. It involved media personalities from each region driving their vehicles in their usual manner for one week while keeping records of their distances travelled and mileage, then having the car or truck tuned up the next week while they took a driver training course, and then comparing their results in the third week — with a tuned-up car and a more aware driver — with their first week's results.

The results were so dramatic that the ministry has now published them in pamphlet form: *10 Proven Ways to Reduce Your Gasoline Use On The Road* which promotes the better driving habits and publishes the savings achieved by each of the participants.

Energy Communications: Government-Wide

As outlined last year, the **Energy Ontario** program — which involves co-ordination of the energy activities of more than 14 ministries across government — is also a major responsibility of the Communications Group.

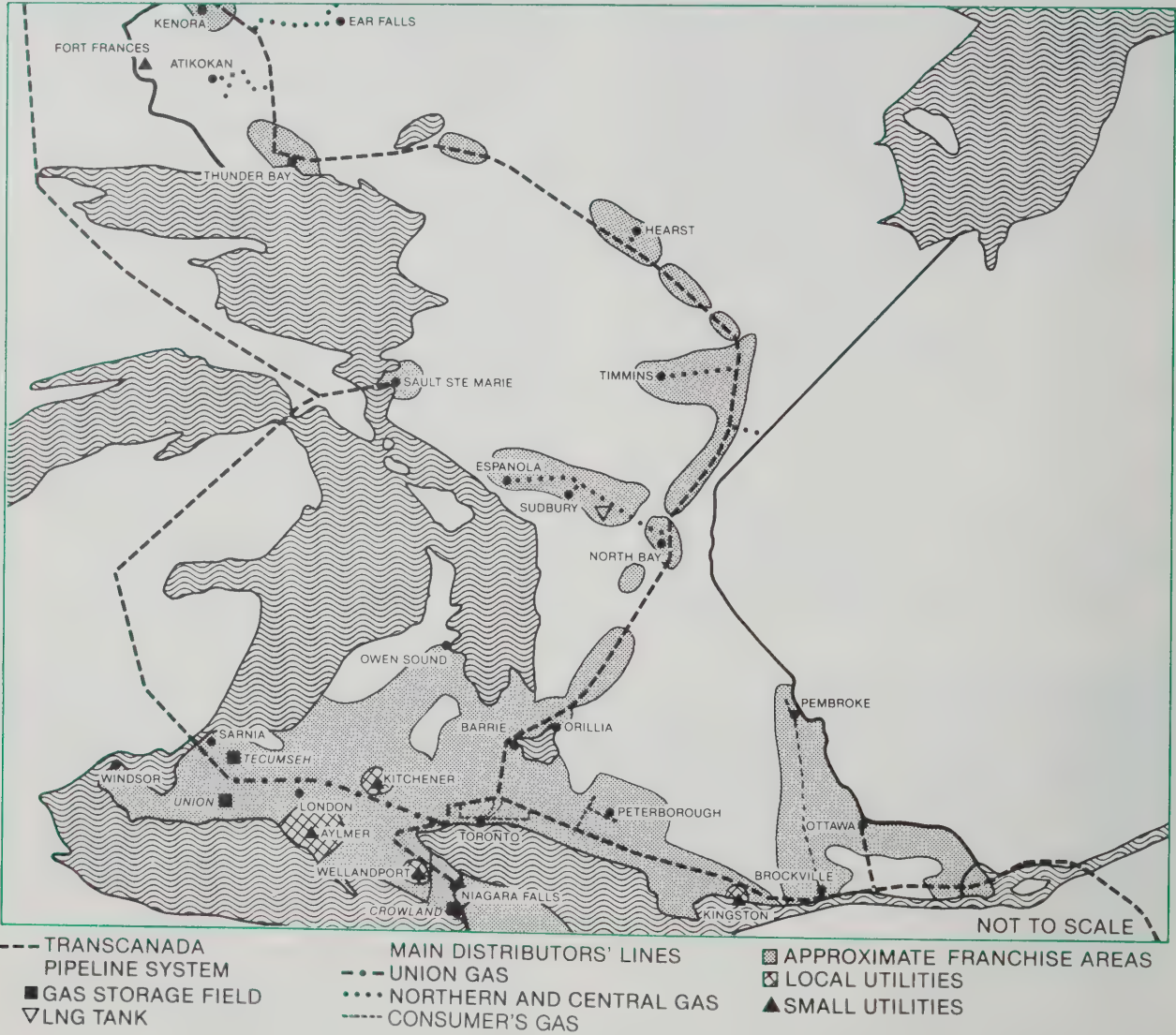
In energy today, a well informed public is key to successful decision-making.

ENERGY REGULATORY AFFAIRS PROGRAM

This program involves essentially the regulation of the Ontario natural gas utilities, the administration of the Ontario Energy Board Act, and the review of Ontario Hydro's electrical rates and rate structures.

Details of the Regulatory Affairs Program can be obtained by reference to the latest Annual Report of the Ontario Energy Board.

Natural gas pipelines and serviced areas in Ontario





Energy Forecasting

During the year, the ministry undertook a number of initiatives aimed at both maintaining and further developing its energy demand forecasting models, as well as improving its knowledge of how energy is used.

Projections of major economic indicators for Ontario have been developed as a backdrop for a long-term forecast of Ontario's future energy requirements.

These energy demand projections were included in the Ministry of Energy's submission to the National Energy Board inquiry into supply and requirements for energy in Canada.

Liaison with Ontario Hydro

During the year, as part of a regular annual review, the Ministry of Energy and Ontario Hydro exchanged information on the assumptions and projections of future energy and electricity supply, demand and prices. As well as discussing future energy supply sources and prices, the ministry provided Ontario Hydro with the preliminary results of the update of its projections of future energy requirements.

The Ministry of Energy's projections of Ontario's energy requirements were presented to the Ontario Hydro Board of Directors as part of the information package related to Ontario Hydro's long-term load forecast. The ministry made available its energy forecasting models to Ontario Hydro and joint efforts are underway to improve them.

Energy Studies

The ministry commissioned a number of energy studies including:

- a review of energy conservation incentives and programs delivered through utilities in other jurisdictions, primarily in the United States;

- an analysis of the impact of alternative taxation policies on synthetic liquid fuel production;
- a review of electricity price forecasts and the factors influencing future electricity prices in Ontario;
- a life-cycle cost analysis and examination of the potential market penetration of heat pumps.

Financial Planning Models

In conjunction with the Renewable Energy Group, the Strategic Planning and Analysis Group developed computerized financial planning models to evaluate proposed energy-from-waste and other capital projects. These models were used in the evaluation of the Nordfibre and London Victoria Hospital projects.

Ontario Energy Review

In March, 1981, the Minister of Energy published the second edition of the *Ontario Energy Review*. This publication is designed to familiarize the Ontario public and policy-makers with the province's energy situation. Rather than discussing energy policy, the review presents a range of basic information guiding that policy. This edition includes a section describing Ontario's energy conservation and alternative energy supply development initiatives.

Policy Analysis Support

Staff of the Strategic Planning and Analysis Group contributed to, and provided support for, the development of the \$165-million, 10-point Oil Substitution and Conservation Program and for the initiatives developed by the Board of Industrial Leadership and Development as outlined in the Premier's statement *Building Ontario in the 1980's*. The Strategic Planning and Analysis staff continues to provide support to these and other new initiatives.

The staff has participated in, or provided analytical support to, a number of ministry and government task forces and studies including:

- review of the Royal Commission on Electric Power Planning recommendations;
- Alternative Transportation Fuels Task Force;
- Energy and Agriculture Policy Committee;
- Hydrogen Energy Task Force;
- transit electrification studies;
- Space Heating Task Force;
- Water Rentals Task Force;
- Ontario Hydro Net Income Task Force;
- BILD Committee and Implementation Task Forces.

Conservation and Substitution
Tax and Fiscal Incentives

Members of the Strategic Planning and Analysis Group have participated in the develop-

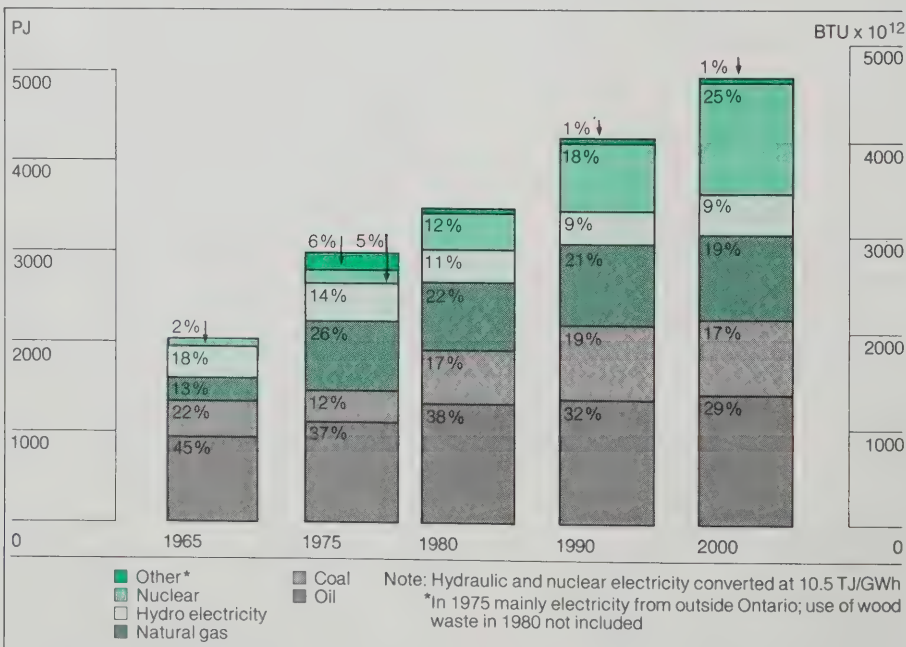
ment of taxation and fiscal policy incentives designed to encourage energy conservation and renewable energy use in Ontario.

Incentives have been provided to encourage the use of non-petroleum fuels in the transportation sector by removing the provincial sales tax from vehicles powered exclusively by electricity or non-petroleum based fuels and by lifting the provincial gasoline tax from these fuels.

Retail sales tax exemptions have been extended to include caulking and weatherstripping materials and water chillers, which recover and re-use waste heat in commercial buildings. In co-operation with the Government of Canada, the two-year "fast write-off" for certain energy-conserving equipment was expanded in scope and extended to 1984.

Further incentives to encourage energy conservation and renewable energy in Ontario are being discussed and developed.

FIGURE 51: Primary energy consumption 1965-2000

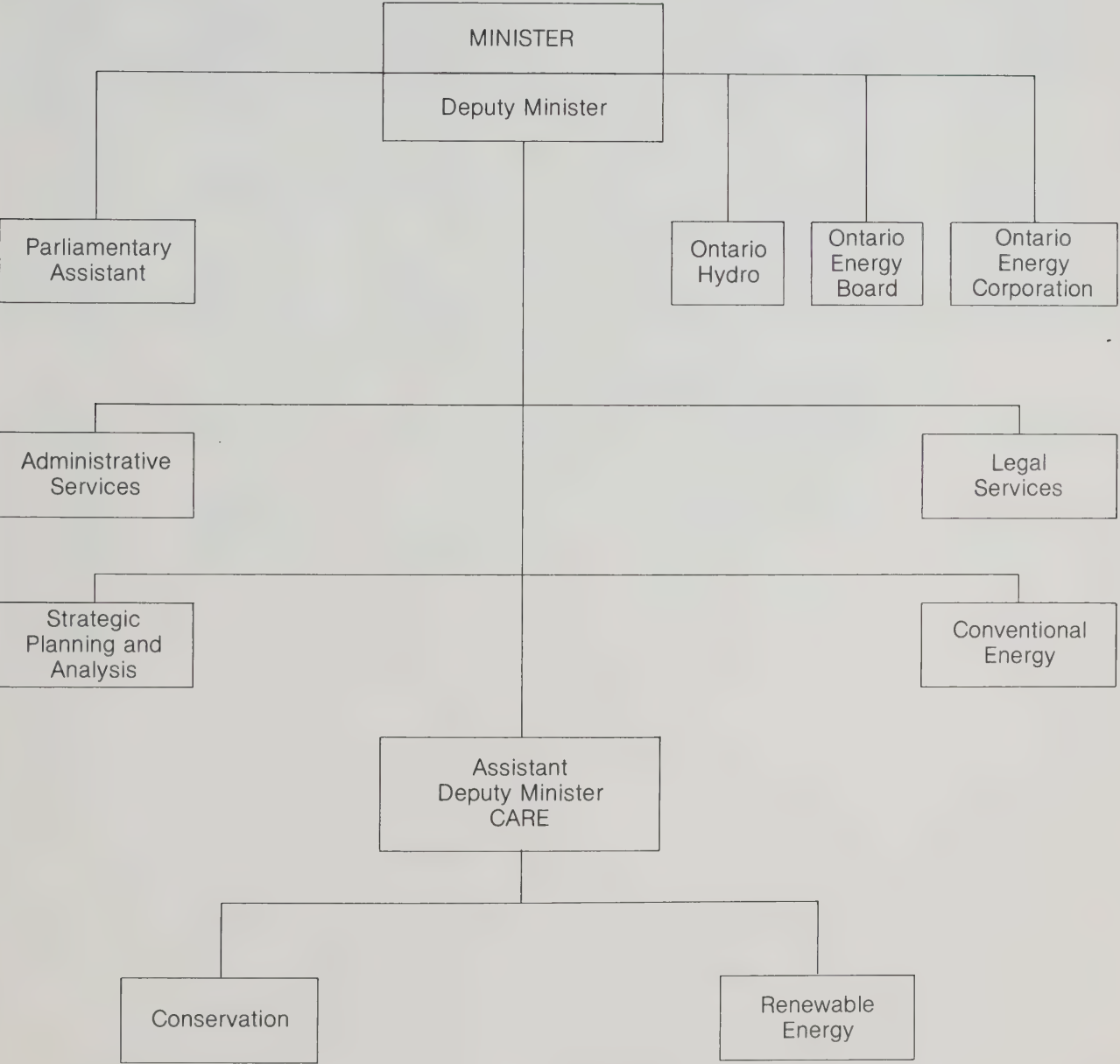


Primary Energy Consumption 1965-2000 in Ontario.

MINISTRY ORGANIZATION



(Total Classified Staff
as of March 31, 1981 – 126)



PROGRAM ESTIMATES SUMMARY

1981 – 82 ESTIMATES	PROGRAMS	1980 – 81 ESTIMATES	1979 – 80 ACTUAL	ESTIMATES
		\$	\$	\$
3,682,000	Ministry Administration	3,081,116	1,269,445	1,507,920
2,673,000	Conventional Energy	2,786,000	2,111,529	2,263,000
12,153,000	Renewable Energy	6,554,000	1,920,538	2,590,000
23,603,000	Energy Conservation	16,847,000	5,403,786	7,187,000
1,710,000	Regulatory Affairs	1,465,000	1,181,952	1,331,000
—	Energy Supply	—	201,141	550,000
43,821,000	Ministry Total	30,733,116	12,088,391	15,428,920
26,478,000	Less: Special Warrant	N/A	N/A	N/A
	Less: Statutory			
27,500	Appropriations	25,116	17,007	23,920
17,315,500	TOTAL TO BE VOTED	30,708,000	12,071,384	15,405,000
	ACCOUNTING CLASSIFICATION			
	Total Budgetary			
43,821,000	Expenditures	30,733,116	11,338,391	15,428,920
—	Total Disbursements	—	750,000	—
43,821,000		30,733,116	12,088,391	15,428,920



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